July 13, 1929 A McGraw-Hill Publication 20 Cents per Copy

AVIATION

The Oldest American Aeronautical Magazine

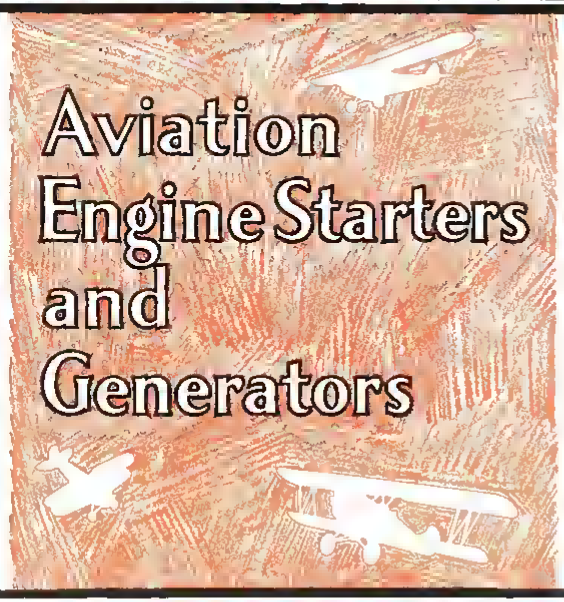
SPECIAL FEATURES

THE TUNISON *"Scout"* MONOPLANE

THE PART THAT THE *Dealer* PLAYS

SHORT SKETCHES OF THE
Aeronautics Branch PERSONNEL

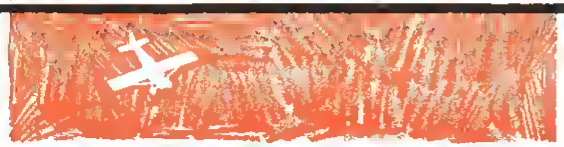
ECLIPSE



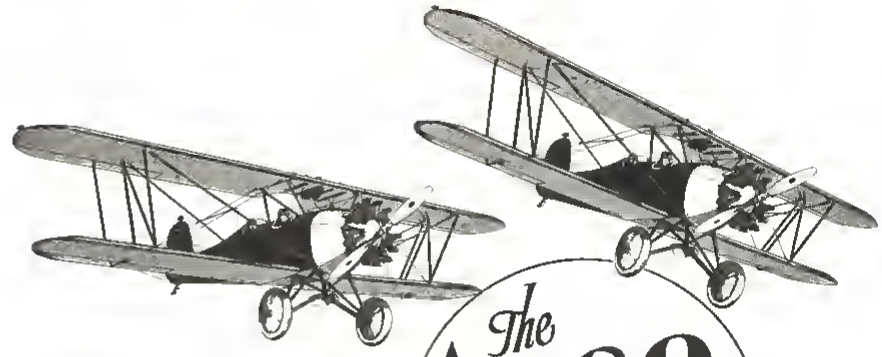
Aviation Engine Starters and Generators

ECLIPSE

ECLIPSE MACHINE COMPANY, East Orange Plant
EAST ORANGE, N.J.
ELMIRA, N.Y. WALKERVILLE, ONT.



AVIATION, July 13, 1929, Vol. No. 27, No. 2. Published weekly by McGraw-Hill Publishing Company, Inc., New York, N. Y. Domestic $4.00 per year, Canada $5.00. All other countries $6.00. 20 cents a copy. Entered as second-class matter July 2, 1928, at the post office at New York, N. Y., under the act of March 3, 1879.



The ARGO

The RESULT of Unified Design

Engine and plane—the importance of one, in its relationship with the other, can only be measured by the perfect functioning of both. Should the pilot demand speed—wings, fuselage and struts must be instantly alert to respond. To strike a happy average is the secret of efficient plane performance.

In the Hess-Warrior powered Argo you are assured of balanced operation. Built in the same plant, plane and engine are equal to any performance with safety.

"To fly it is to buy it"

The Hess-Warrior is a seven-cylinder, radial, air-cooled engine and develops 125 horsepower at 1800 r.p.m. Designed and built in the same plant, the Hess-Warrior engine and Argo plane function in perfect unison—a natural result of unified construction.

The HESS-WARRIOR AIRCRAFT ENGINE

The ALLIANCE AIRCRAFT CORPORATION,
Alliance, O.

STUDENTS Become BETTER PILOTS More Quickly With ROBIN TRAINING

The quiet of the closed-cabin Robin mokes conversotion eosy, thus permitting student ond instructor to osk ond onswer troining questions in the oir—where they count. This soves time ond offords thorough instruction.

Exclusive performonce ond economy of operotion strongly recommend the Robin os the foremost closed-cabin troining plone thot is ovoiloble todoy.

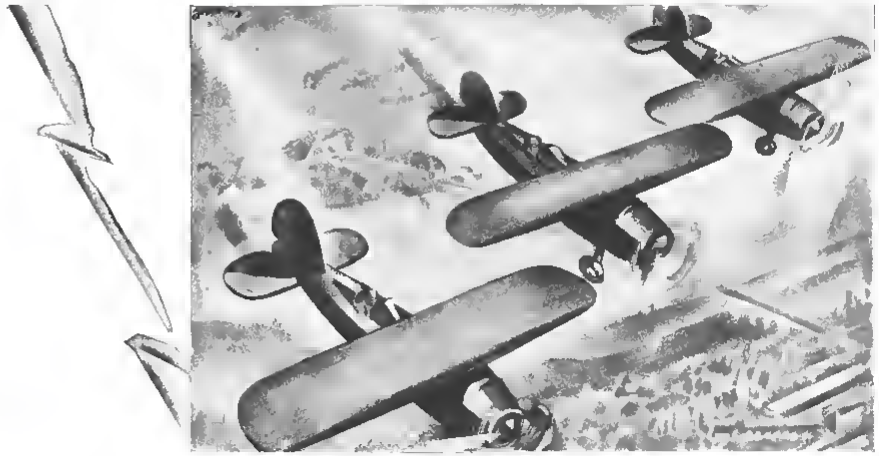
CURTISS FLYING SERVICE

27 West 57th Street, New York City

Sole Sales Agents for CURTISS-ROBERTSON AIRPLANE MFG. CO.

CURTISS AEROPLANE AND MOTOR CO., INCORPORATED — SIKORSKY AVIATION CORPORATION
CESSNA AIRCRAFT CO — IRELAND AIRCRAFT, INC — COMMAND AIRE, INC

"—WORLD'S OLDEST FLYING ORGANIZATION"



WING to WING with the leaders of aviation

Goodrich has staked out its field in aviation. ¶ The realm of the heavier-than-air craft is its zone of endeavor. ¶ There Goodrich has pioneered . . . there Goodrich has helped write airplane history. And there Goodrich flies with the leaders, with its products as far advanced over others as the modern airplane is advanced over the biplane of two decades ago. ¶ Famous pilots have *proved* the superiority of Silvertown Tires with world records in the air. And for the *fourth consecutive time this year* leading manufacturers have chosen Goodrich equipment as *the leader at the four major aircraft shows!* ¶ From nose-tip to tail-wheel Goodrich makes *every* rubber product for aviation. Wing to wing with the leaders of aviation today *forty* Goodrich rubber products fly. ¶ The B. F. Goodrich Rubber Company, Established 1870, Akron, Ohio. Pacific Goodrich Rubber Company, Los Angeles, Calif. In Canada: Canadian Goodrich Company, Kitchener, Ontario.

"SPLIT SECOND" SILVERTOWNS — World Records Have Proved Them

Goodrich *Rubber for Aviation*

Physical Properties

IN attaining a position of definite leadership in the industry, Great Lakes Aircraft Corporation has built with foresight, on a sound and practical foundation—believing that the best workman is worthy of the best tools.

Outstanding engineering ability, skilled craftsmanship, experienced management and sound financial standing have been combined with the most adequate and modern working equipment.

Eighty acres of ground, well located on the outskirts of Cleveland—a large well graded landing field—hangar facilities—over 90,000 square feet of manufacturing space including a recently completed addition of 10,000 square feet—complete modern equipment for the heat treating and fabrication of duralumin—extensive physical and chemical laboratories—modern progressive straight line assembly—every facility for the production of quality airplanes on a quantity basis has been placed in the hands of a young, aggressive organization thoroughly conversant with aircraft manufacturing practice.

Such facilities, backed by a progressive production and merchandising program assure to every purchaser of a Great Lakes plane, not only a product of unquestioned merit but one definitely associated in the public mind with leadership in the Industry.

Number Five of a series of fact-statements regarding a new Industrial leader—
GREAT LAKES AIRCRAFT CORPORATION

GREAT LAKES AIRCRAFT
CORPORATION CLEVELAND

the Ships *...and the* Engines *...and the* MEN to Run Them, *too!*

MAN-POWER is the vital factor in Aviation today! Who will man the merchant ships of America's air fleet? Whence will come the pilots of the sky; the ground men; the mechanics; the builders; and the engineers?

St Louis, center of aviation activities, is fast developing an *army* of such trained men. Here the production of *men* keeps pace with the output of planes and engines. They are coming by the hundreds from St. Louis' Aviation Schools. In four of these, more than a thousand men are enrolled today .... And new schools are being founded.

Opportunity for the Individual .... Expert Man-Power *for the* Manufacturer

For here, winging through the Middle West, air-transport is an accomplished fact. Passengers, mail and freight are moving on schedules clocked like a transcontinental express. Behind every ship that flies are the pilots, mechanics, riggers, radio operators, chemists, electricians, navigators, aeronautical and airport engineers, airport managers, traffic solicitors, salesmen and others—the *men* who make commercial aviation possible.

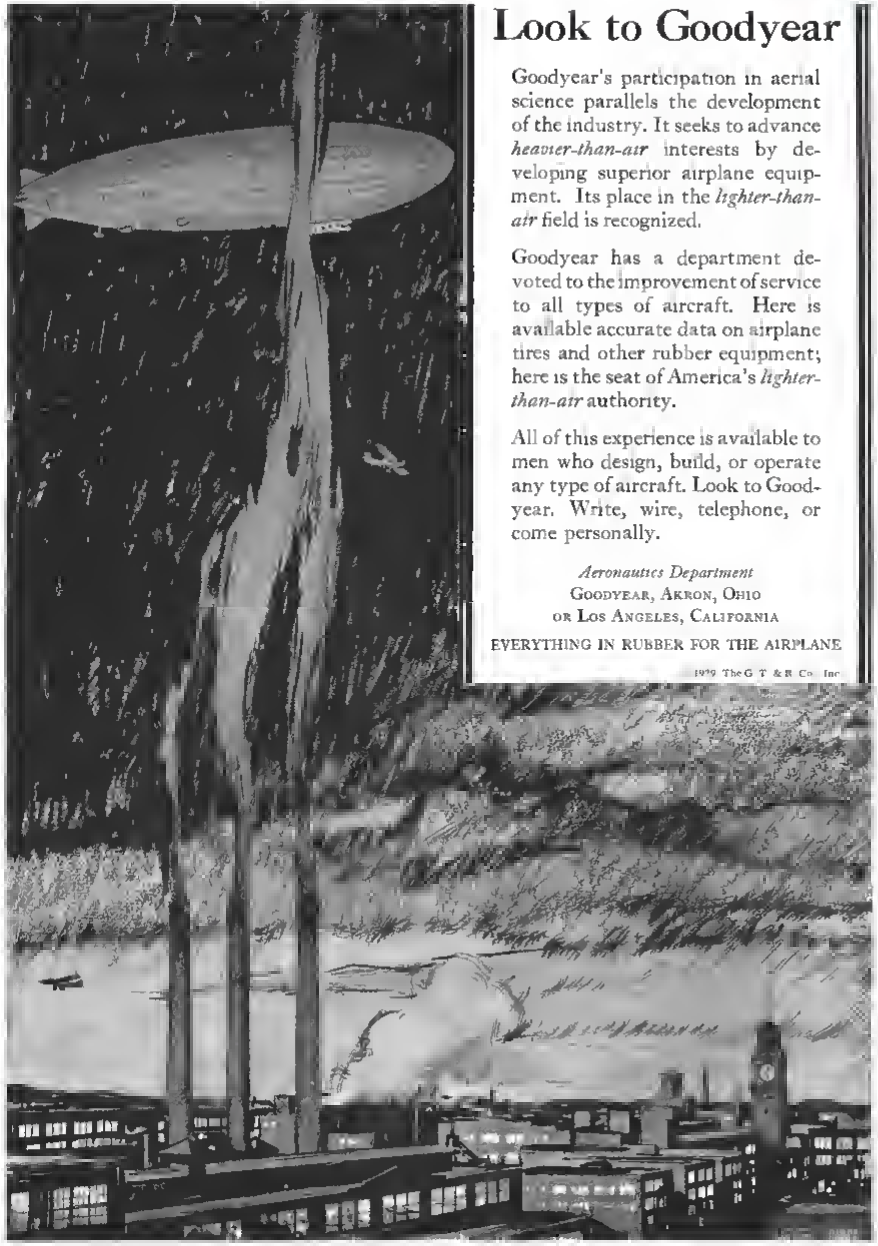
If ambition beckons to a career in practical aviation, aloft or on the ground, here in St. Louis is your best instruction. Here is every facility, machine, engine, plane. Here your instructors are nationally known. Here you can learn a specialized profession.

If you are a manufacturer, here are the men to take your drawings and create the ships that your designers plan. Here are men who know .... *The men to build your planes, and fly them, too!*

For information on aviation opportunities in the St. Louis District, write to the INDUSTRIAL BUREAU of the INDUSTRIAL CLUB of ST. LOUIS
Please address all communications to Dept. A-2.

Shipments "F A St. L." (*Flyaway St. Louis*) means arrival at destination within 5 hours at any point within the 500-mile St. Louis Circle, whose population exceeds 50,000 000 people.

St. Louis
—THE *NATURAL* CENTER OF AVIATION



Look to Goodyear

Goodyear's participation in aerial science parallels the development of the industry. It seeks to advance *heavier-than-air* interests by developing superior airplane equipment. Its place in the *lighter-than-air* field is recognized.

Goodyear has a department devoted to the improvement of service to all types of aircraft. Here is available accurate data on airplane tires and other rubber equipment; here is the seat of America's *lighter-than-air* authority.

All of this experience is available to men who design, build, or operate any type of aircraft. Look to Goodyear. Write, wire, telephone, or come personally.

Aeronautics Department
GOODYEAR, AKRON, OHIO
OR LOS ANGELES, CALIFORNIA

EVERYTHING IN RUBBER FOR THE AIRPLANE

1929 The G T & R Co. Inc.

3 Points supporting Pedrick supremacy

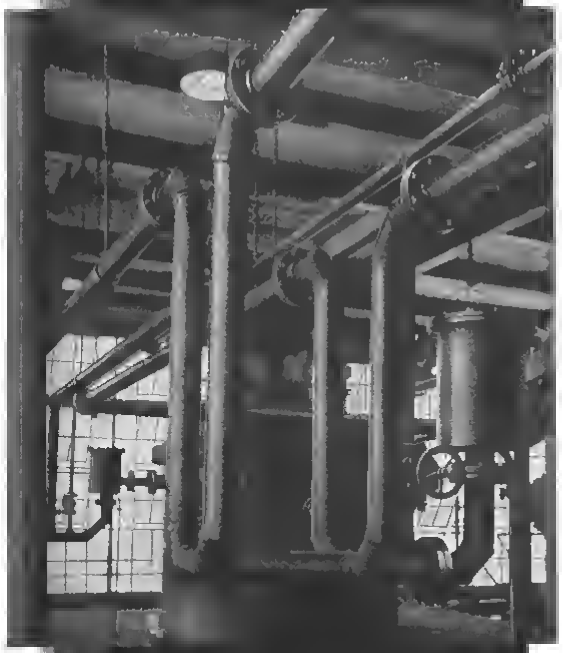
1-MADE TO SPECIFICATIONS. PEDRICK Heat-Shaped piston rings conform to the specifications of the engine designer. PEDRICKS are approved and used by many leading engine builders. We will send upon request a reprint of an article from the Journal of the Society of Automotive Engineers entitled "Important Factors in Piston Ring Design." It explains why conventional piston rings are best.

2-EVERYWHERE AVAILABLE. The PEDRICK distributing organization is world-wide in its scope. *Everywhere* adequate stocks of PEDRICKS are in the hands of reputable merchants ready to render service. Write now for the name of the nearest Distributor carrying a complete PEDRICK stock.

3-THE WELL KNOWN PEDRICK QUALITY never varies. All PEDRICKS are Heat-Shaped—set to tension by heat. In this process every ring is made round from the start by machining a circular casting. In the last step of the process the finished casting is split and spread open the correct distance to give it the proper tension. Held in this spread position it is set to that correct shape by heating it to 1200 degrees Fahrenheit. Because the setting to this shape under heat is the last operation of the process, the exact desired shape is *always* obtained. Furthermore, the shaping under 1200 degrees Fahrenheit removes all internal stresses which may have been set up by casting, cutting and machining—stresses which, if permitted to remain in the ring *as in all other processes*, would cause the ring to warp or to lose tension. But PEDRICKS cost no more, even in the oil-control type, than ordinary snap rings—25c each, and up.

Wilkening Manufacturing Co.
Philadelphia

WELDED Industrial Piping



"Proper methods of inspection and procedure control have been established and are available to all interested; so there is no longer any excuse for poor work. Welded lines are often cheaper in first cost, and are invariably superior in the matter of tightness."

—From an Editorial in POWER

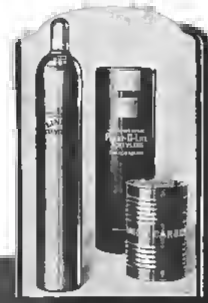
As pioneers in procedure control welding, we supply industry with the best of everything for oxwelding and cutting.

LINDE OXYGEN
The Linde Air Products Company

Prest-O-Lite
Dissolved Acetylene
The Prest-O-Lite Company, Inc.

Oxweld
Apparatus and Supplies
Oxweld Acetylene Company

UNION CARBIDE
Union Carbide Sales Company



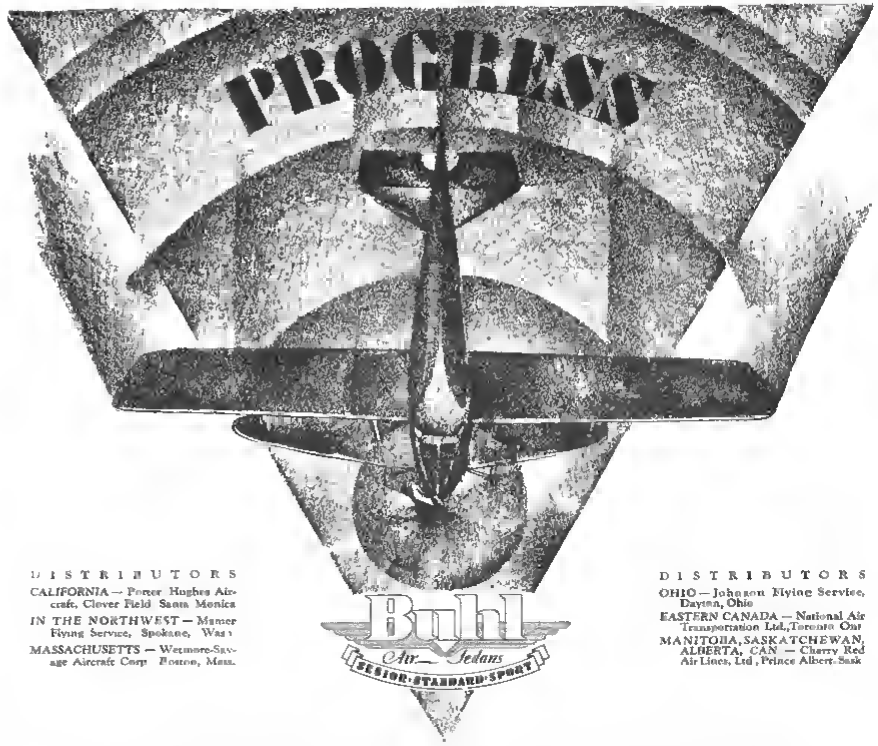
Units of
UNION CARBIDE AND CARBON CORP.

General offices
30 East 42nd Street
New York, N. Y.

UCC

Sales offices in
Principal cities throughout the country

64 Linde plants—45 Prest-O-Lite plants—154 Oxygen Warehouse stocks—138 Acetylene Warehouse stocks—38 Apparatus Warehouse stocks—235 Carbide Warehouse stocks



DISTRIBUTORS
CALIFORNIA — Porter Hughes Aircraft, Clover Field Santa Monica
IN THE NORTHWEST — Manner Flying Service, Spokane, Wash.
MASSACHUSETTS — Wetmore-Savage Aircraft Corp. Boston, Mass.

DISTRIBUTORS
OHIO — Johnson Flying Service, Dayton, Ohio
EASTERN CANADA — National Air Transportation Ltd., Toronto Ont.
MANITOBA, SASKATCHEWAN, ALBERTA, CAN. — Cherry Red Air Lines, Ltd., Prince Albert, Sask.

It is not enough to create an airplane; say "See, she flies," and rest on the laurels of the moment. Victory is not conquest, but the start of a harder, sterner struggle. The aviation industry demands far more than skill and knowledge and experience. To it must be brought the unlimited resources which permit constant research and development. There, and there only, lies real progress. That is why the Buhl Aircraft Company is so well fitted to maintain the leadership which marks its present position in the industry. It moves slowly and relentlessly toward its goal, pouring men, money and materials into a manufacturing melting pot from which emerge airplanes that represent the highest possible degree of present day safety and efficiency. That is progress. It will endure because it is soundly conceived and ably executed. We shall be pleased to mail catalogs or details of our dealer plan.

BUHL
MARYSVILLE, MICHIGAN
AIRCRAFT...COMPANY

LEBLOND

Another SRB BALL BEARING EQUIPPED AERONAUTICAL ENGINE

The greatest aeronautical engines in America use SRB Ball Bearings as standard equipment.

In addition to the LEBLOND 5 cylinder model 60 Aeronautical Engine, giving such an unexcelled performance in its power field, SRB Ball Bearings are in such world-known engines as Wright, Pratt & Whitney, Curtiss, Velie, Warner and others.

STANDARD STEEL AND BEARINGS INCORPORATED
Plainville DIVISION OF MARLIN ROCKWELL CORPORATION *Connecticut*

PACIFIC COAST DISTRIBUTORS—F M Cobbledick Co. *San Francisco, Cal.* E D Maltby Co., *Los Angeles, Cal.* Northwest Bearings Co., *Seattle Wash.*

Ball SRB Bearings

And now—Sherwin-Williams Airplane Finishing Specifications

A complete, authoritative guide to the most advanced approved methods. All about dopes, lacquers, varnishes, enamels, primers, surface preparation, etc., and how to use them.

CLEARLY and concisely told by Sherwin-Williams finishing experts who have made a thorough study of the specialized needs of the airplane industry. Facts only. No theories. Every product, every method practical under workshop conditions.

Sherwin-Williams have been making high grade protective finishes for over sixty years. Each new advance in American industry has found Sherwin-Williams alert—with their great research facilities and manufacturing resources attacking new finishing problems—and solving them brilliantly.

And today Sherwin-Williams are keeping pace with the giant strides of the airplane industry by developing new finishes to meet its specialized needs.

The Sherwin-Williams "quality" airplane line of finishes is complete. It includes primers, lacquers, enamels, varnish and dopes. All products are certified by our laboratories and flight tested. Extreme durability, economy in application and pleasing colors of maximum visibility have led prominent manufacturers to adopt the S-W line as standard.

Color and Visibility Service

Our skilled colorists will be glad to advise you on increasing visibility by means of light reflecting colors contrasts etc. Also in the planning of distinctive color combinations that help build sales.

Send the coupon below for the S-W Airplane Finishing Specifications Book or any other information you may wish.

VISIT OUR BOOTH AT THE NATIONAL AERONAUTICAL EXPOSITION, CLEVELAND, OHIO, AUGUST 24TH TO SEPTEMBER 2ND, 1929

THE SHERWIN-WILLIAMS CO.
Cleveland, Ohio

The Sherwin-Williams Co.
Dept. 781 601 Canal Road N. W. Cleveland, Ohio.
Gentlemen:
Please send me your Airplane Finishing Specifications Book.
Name *Business Title*
Address
City *State*

SHERWIN-WILLIAMS AERO FINISHES

For planes, hangars and equipment

AVIATION

The Oldest American Aeronautical Magazine

EDWARD P WARNER, *Editor* — JAMES H. McGRAW JR., *Publishing Director*

R SIDNEY BOWEN, JR., *Associate Editor*

LESLIE E. NEVILLE, *Technical Editor* — JAMES P. WINES, *Assistant Editor*

HERBERT F. POWELL, *News Editor* — CHARLES H. GALE, *Assistant Editor*

CHARLES F. McREYNOLDS, *Pacific Coast Editor* — EARL D. OSBORN, *Contributing Editor*

CONTENTS

July 13, 1929
VOLUME 27 — NUMBER 2

McGRAW-HILL PUBLISHING COMPANY, INC.
Tenth Avenue at 36th Street, New York, N. Y.
Cable Address: Machinist, N Y*

JAMES H. McGRAW, Chairman of the Board
MALCOLM MUIR President
JAMES H. McGRAW JR. Vice-Pres. and Treas.
EDWARD J. MEHREN Vice-President
MASON GRIFFITH Vice President
HUGH KELLY Vice-President
HAROLD W. McGRAW Vice President
H. C. PARMELEE Editorial Director
C. H. THOMPSON, Secretary

New York Dist. Office, 285 Madison Ave.
Washington, National Press Building
Chicago, 520 N. Michigan Ave.
Philadelphia, 1600 Arch Street
Cleveland, Guardian Building
St. Louis, Bell Telephone Building
San Francisco, 883 Mission Street
Boston, 65 Franklin Street
Greenville, S. C., 1301 Woodside Building
Detroit, 7-257 General Motors Bldg
London, 6 Bouverie St., London, E. C. 4

AVIATION
THE OLDEST AMERICAN AERONAUTICAL MAGAZINE
A McGRAW-HILL PUBLICATION ESTABLISHED 1916
EDWARD P WARNER *Editor*
VOLUME 2 . . . *July 13, 1929* . . . NUMBER 3

Fool Stunts

WING-WALKING, plane-changing, and trapeze performances on the landing gear happily seem to be losing their power to excite. The enthusiastic disapproval of the Department of Commerce and of certain state regulative authorities, combined with the staleness born of frequent repetition at innumerable county fairs, are sending them to join tight-rope tours over the brink of Niagara among the games no longer worth the candle. Only in the films do they survive in great force, and even there the battles to the death waged on the wing of a Jenny become less frequent, and the stunt men are turning their energies to the more legitimate, if no less hazardous, art of crashing planes with picturesque completeness in war pictures.

The disappearance of stunting competitions conducted on a level with the housetops in order that the judges might miss no detail of the pilots' virtuosity is an equally encouraging sign. Stunting is disappearing from commercial aviation, as it should, and being relegated to its proper place as a necessary military operation, to be displayed on occasion by selected military and naval pilots, operating under conditions assuring a reasonable degree of safety. Violent acrobatics form no part of the regular requirements of civil flying, and the competent civilian pilot ought to have more important things to do.

But spectators must have their thrill. As personal acrobatics on the airplane go out, parachute stunting comes in. There are alarming indications of a renewed interest in delayed-opening-drop records and even of the holding of competitions to be won by the jumper who allows himself to fall nearest to the ground before pulling the release ring.

It is difficult to find words to characterize such performances. To offer a prize to the competitor who is willing to come nearest to committing suicide in front of a crowd is to promote an event on a moral level with the gladiatorial combats of the Roman Empire. The occasional making, by skilled and experienced men, of jumps from high altitudes in which the opening of the parachute is deliberately delayed is justifiable as an experiment and as a means of instilling confidence in their parachutes into novice pilots who witness or hear of the test. Such trials ought, however, to be made under rigorous specifications from higher authority, and the competitive element ought to be firmly excluded.

The aviation industry will have to find the great bulk of its markets among people who have no special desire for excitement. Every suggestion, direct or indirect, that the airplane or the parachute or any other aerial device is a stunt instrument can be relied on to increase sales resistance. The industry should stand with a united front against whatever imports the lurid or the hair-raising into the aeronautical atmosphere, and it should have the full support of the government departments concerned.

//

Country Club Aviation

THERE ARE as many different kinds of flying as there are of operation on the surface of the water. Motor-boating and sailing as sports would make very poor progress if they had to depend on the port facilities established for ocean liners. Similarly flying for pleasure has been grievously handicapped in many communities by the necessity of basing it upon a field established and planned from solely commercial considerations.

The best field for air transport operations is located near to a business center, sometimes on filled land along a commercial harborfront. Frequently in an industrial area where highways of approach were designed for heavy trucking rather than for comfort and where sights and sounds and smells are not ideally attractive. The same is true of many railroad stations, and the traveler will tolerate such annoyances for the sake of the time that he saves, but the pilot on pleasure bent is less likely to accept them with complacency. Some cities have found land close at hand in an attractive suburb which can be developed as a commercial airport, but such good fortune

cannot be common, and many residential communities firmly oppose the entry of commerce in any guise

The logical outcome is the separation of private and commercial flying, at least in the largest cities and the provision of flying facilities in conjunction with those country club attractions which the pilot maintaining his own plane for pleasure is likely to appreciate Clubhouse and tennis courts or swimming pool or the like are hardly less important than hangars in making the flying field a place of week-end rendezvous

It is upon that general theory, and also with the object of providing for the co-operative ownership of planes for the sole use of club members sparing them the necessity of maintaining individual machines at all times that the Aviation Country Clubs have been founded The opening of the first Aviation Country Club s unit on Long Island two weeks ago marks the inauguration of a movement that deserves to grow and that should have the fullest support of the aeronautical industry

The development of fields that are pleasant places for sport flying either along or in combination with certain commercial operations, need not, however, be solely in the hands of clubs There is an opportunity for commercial organizations to provide similar service Field operators should provide buildings that are neat and attractive and insist that they be kept so Club-rooms and special hanger spaces may be set aside for the use of private pilots and their guests And supplemented by some of the entertainment equipment of a week-end resort. The impulse to private ownership of a plane will be stimulated where too often the business-like and matter-of-fact atmosphere, as well as the environment, of a commercial airport acts to stifle it The operator of the field will put himself in line for increased revenue for instruction, storage and servicing, and one of the aircraft manufacturer's most promising future markets will be broadened

//

No Circus

THE INCLUSION of a woman's cross-country race in the events of this year's National Air Races is a significant innovation For the first time there are enough women fliers to warrant an event of this kind The prize money which will amount to ten thousand dollars places the event very distinctly in the professional class Several of the women who plan to enter are earning their living through some connection with the flying game, though none of them are employed solely as pilots.

There are only about sixty licensed women fliers against six thousand men, but a considerable number have shown real ability Although there may be a question as to whether women will compete with men as professional pilots they should be allowed to prove their flying ability Much of the flying done by women has been for the sake of publicity, either for themselves or for the people who were exploiting them A 2 000 mile flight is a real affair It is to be hoped that neither any of the participants nor the reception committees along the route will give the event a circus flavor The women are out to show that they really can fly Go easy on the entertainment and see what they can do.

//

Airships Across the Pacific

THE RECENT ANNOUNCEMENT of a plan to operate the first American rigid airship service from California to Honolulu, rather than across the Atlantic, may have surprised some who read it If so, they know little of the Eastern Pacific or of the relative difficulties presented to flying there and on the North Atlantic

Modern airships have repeatedly proved their ability to make the Atlantic crossing With the exception of the Graf Zeppelin's recent false start, when a return was forced by engine trouble, they have a perfect record of completion of all the flights attempted On the other hand the Atlantic has been attacked judiciously, at selected seasons and in weather conditions at least promising not to be abnormally bad More experience is needed before a regular service can be scheduled to carry passengers the year round The run to Hawaii crosses a region in which severe storms are almost unknown The winds are of virtually constant direction and force There are no extremes of temperature to be encountered The distance is even shorter than that between New York and London It offers an excellent opportunity for getting experience in safety and building up the airship's reputation for reliability of operation among the lay public Continuous service to Europe would be a natural sequel It is no confession of weakness to tackle first the problem which promises to be simplest of solution

There is no aerial undertaking which is more deserving of governmental support than the attempt to provide improved communications with that little piece of America which lies in mid-Pacific Although it goes without saying that we always seek for the best and swiftest means of travel between our own territory and all foreign lands, it is a matter of relatively little national concern whether or not the tourist saves a couple of days on his way to Europe To facilitate frequent visits to the mainland by the American resident in Hawaii, however, to enable him to do his business here by personal contact and to keep in constant touch with the way of life in the continental United States, should be a vital concern of national policy The starting of an airship service that will cut the time from the four and a half days that is the best possible by existing means to something like forty hours ought to be promoted by subventions and mail contracts of extreme liberality, even if it is then necessary to economize by postponing any provisions for trans-Atlantic operation Congress ought to act at the first opportunity to broaden the foreign air mail contract law As originally passed, it was adapted for only limited range of cases, such as exist in using airplanes of moderate size for service in the Caribbean or elsewhere where mail loads at best are relatively light Until the legal situation is clear, and the income to be had from governmental sources is positively known, it cannot be expected that financial support for airship lines to our Pacific dominions will be easy to find.

//

With Jammed Controls

IT IS many months since the Department of Commerce, with great wisdom, pronounced a regulation prohibiting the carrying of passengers for hire behind a dual control unless it had first been rendered inoperative Unfortunately the newspapers bring occasional evidence, often in tragic form, that the rule is being ignored or that pilots are unaware of its existence or scope Unfortunately a novice passenger who rides free, as the guest of the pilot, is quite as likely to grab the stick at a critical moment, or to jam his toe under the rudder-bar and keep it there, as one who pays five dollars for his trip Unfortunately the rudder-bar, which very frequently cannot be removed, is sometimes "rendered inoperative" by covering it up in so slipshod a fashion that the possibility of jamming is by no means absolutely excluded

This is a serious hazard It is a removable one and there should be a concerted effort to eliminate it. There is no place for a back-seat driver in an airplane Especially if he does not know how to drive

The regulation covering the matter should be rigorously enforced, and its enforcement should not be left to the periodic visits of an overworked Commerce inspector. Field managers should insist that every pilot however great his personal skill, obey it, precisely as most of them make it their business to see that no plane takes the air without registration or identification numbers The present regulation should be broadened to include guest passengers under certain conditions On the other hand, it would be easy to go too far, and even the existing rule falls with undue severity on some individuals There is no reason to forbid an experienced passenger, who may be physically unqualified for a pilot's license or who may not care to go to the trouble of getting a student's permit, trying the controls of a plane while in flight A designer who is quite unable to qualify as a pilot may often wish to do that much It would be outrageous to prevent him.

It is the passenger's experience and aeronautical knowledge, not the amount that he pays for the flight, that determines his safety in proximity to a control The burden of proof should be on the passenger, but he should not simply be forbidden to touch the stick. Perhaps there should be a 2nd class of students permit requiring no physical examination and good for several years, permitting dual instruction but no solo flying at any time. Perhaps the same end can be better accomplished in some other manner

The Department of Commerce and the pilots cannot dispose of this issue alone The manufacturer of airplanes also has a responsibility No machine should ever go out fitted with dual control without some positively safe means of removing the control or making obstruction impossible Means to that end should never have to be extemporized by the operator of the plane. They must be put into the machine by the designer.

//

Manufacturer Participation

AS THESE FEW LINES are being written the City of Cleveland" is on the ground with a new world s refueling endurance record to its credit. Her crew are receiving deserved congratulations on the perseverance which led them to success, and half a dozen other planes are in the air over various parts of the country with their pilots, each seeking to establish an even better record

To say that this latest aeronautic fad as conducted at the moment is not particularly helpful to the industry would be but a waste of words, for as long as there are pilots there will be a constant attempt to out-do the other chap in any new stunt that becomes popular

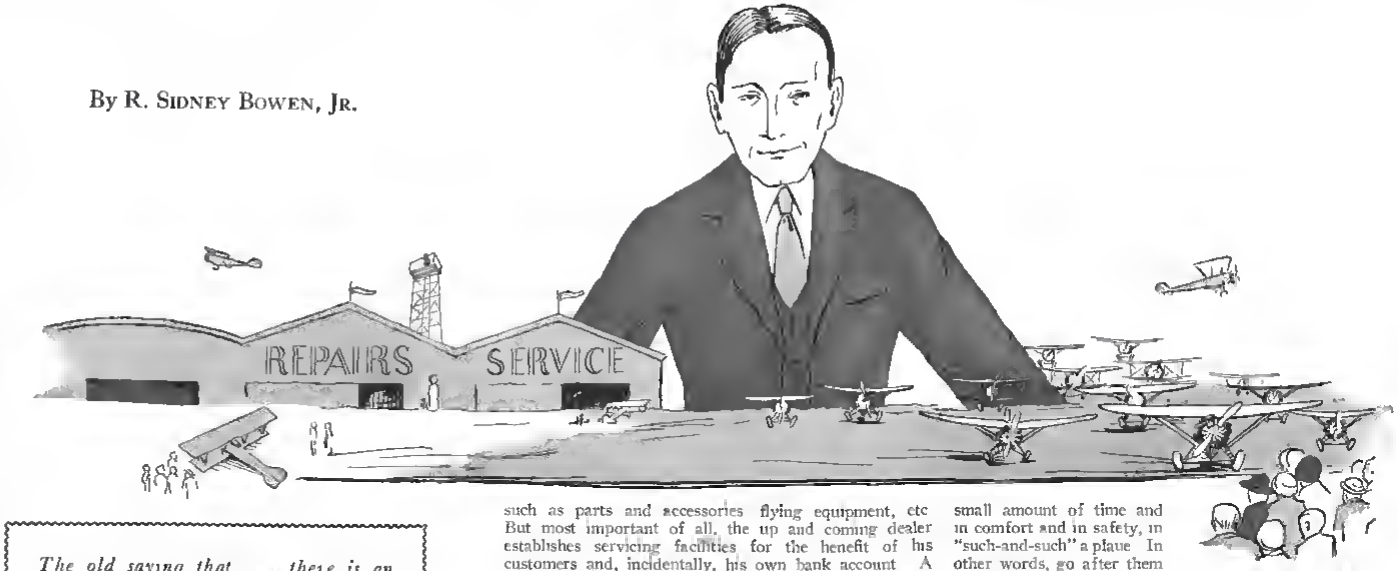
Although human stamina has sometimes proved the limiting factor in two-man refueling flights, when the mechanism does fail in a long flight the knowledge of just why it failed is unquestionably of definite value to the development of better aircraft and engines Which all means that it would prove a splendid thing if such refueling tests were to be conducted by airplane and engine manufacturers themselves instead of by chaps who are mighty fine pilots but are not aeronautical engineers If records are worth making at all they are worth the while of the industry

In days gone by the plane and engine manufacturers sat back and let the Army and Navy fly their products to all sorts of new records and all sorts of favorable advertising and publicity, and today they are sitting back and watching the commercial pilots do the same thing That the modern plane and engine are credits to their designers is obvious They are products of which all concerned in their development have reason to be proud Yet there will always be room for improvement and if all the manufacturers would conduct or closely supervise more extensive stock-model operation tests such as endurance flights, they would obtain valuable data on the faults of their products which they can never secure by block testing and wind-tunnel experiments alone.

AVIATION July 13, 1929

THE PART THAT THE *Dealer* PLAYS

By R. SIDNEY BOWEN, JR.



THE PART that the dealer plays in a national sales organization is in a certain sense the most important part of all for it is the dealer who actually contacts the buying public The manufacturer may make a good product the distributor may distribute that product effectively and efficiently in his territory, but it is within the power of the dealer to wipe out by bad selling practices all of the effort and time behind the manufacturer and distribution of a plane and thus kill the final retail sale Naturally, no dealer will knowingly endeavor to kill a sale However, it is within his power to do so, and possessing that power makes him the most important part of a national sales organization whose perpetual goal is increasing retail sales volume

Because of that responsibility that rests with the dealer, manufacturers and distributors should exert more than a little care in the selection of dealers And that, incidentally works two ways The dealer should be just as particular in the selection of the product he intends to merchandise As regards good products bad products, fast selling products, and slow selling products, the aeronautic industry is no different from any other industry that is catering to a buying public At the present time most manufacturers are hitting on all six in an effort to build up a national selling organization and because of that, almost any sufficiently financed individual or organization can obtain an airplane dealership for the asking *"Caveat emptor"* might prove a fitting motto for the prospective dealer who now stands upon the threshold of the aeronautic industry

HAVING ONLY STUDIED the products available and assured himself of what is worth while and what is not, the dealer's next step is to determine the nature of the market that exists in his locality Of course, there is the possibility of creating that market Yet, on the other hand he who starts with some sort of a market to tackle stands a much better chance of obtaining adequate business turnover in the first year, than he who starts from scratch In other words the dealer should pick the product to suit the needs of his local market and not pick a market to suit any plane that he may obtain under contract As an example, selling tri-engined transports to flying clubs is just as lucrative as selling refrigerators to Eskimos All of which means that the prospective dealer should rightly study and analyze the market or markets that exist in the territory where he intends to conduct his business Then select the plane that fits in with the needs of the most promising market

There is, of course, the matter of representing more than one manufacturer, and although this practice is at present being discouraged to quite some extent, it is really not altogether bad business from the standpoint of the dealer, or from the standpoint of the manufacturers concerned, provided each plane has an altogether separate selling story and is not a direct competitor of the other For instance, a four or six-passenger cabin job that fits in well with the needs of business houses

The old saying that . . . there is an exception to every rule . . . can be applied in full to this article which deals with the part that the dealer plays in a national sales organization While sales methods are all fundamentally similar, local conditions and the human element add or detract from their respective values.

is not going to injure the sales chances of a two place sport or training plane That is if the dealer gives attention to both markets, and no worth while dealer is going to take on one or more products if he thinks that one may lag by the wayside As a matter of fact, his ultimate selling costs and overhead will keep his efforts jacked up

Having determined the right market and having selected and obtained the dealership of a plane which suits the needs of that market the dealer then embarks upon the task of deriving dollars and cents profit through the sale of airplanes primarily By that we mean that no progressive dealer should be restricted solely to the sale of airplanes As a matter of fact at the present time he would starve to death through lack of business Therefore he takes on related accounts, such as parts and accessories flying equipment, etc But most important of all, the up and coming dealer establishes servicing facilities for the benefit of his customers and, incidentally, his own bank account A reputation for good service is one of the finest selling assets that a dealer can possess It not only holds the good will of his customers but enables him to contact them for new or additional sales

It is, of course, assumed that the dealer has availed himself of space at the local flying field in the event that he does not have a flying field of his own, and also that he has purchased a demonstrator plane in which to fly his prospects

With the price of airplanes at present being more than the average pocketbook can stand on an all cash basis, it is to the advantage of the dealer to make arrangements with some reputable financing company to carry his customers through a time payment period In this matter the dealer should solicit and request the assistance of his distributor and the manufacturer as it is rightly part of their job to assist him in every way possible to increase his sales volume Naturally they also benefit from such endeavors

THE SELLING METHODS to be employed by a dealer are dependent upon the type of product he is endeavoring to sell For instance if he is handling a sport plane, he will direct his selling efforts toward the convincing of prospective customers of the pleasure advantages, etc., to be gained by owning "such-and-such" a plane Whereas if he is handling a business man's plane such as a cabin job, he will naturally go after the business world and endeavor to convince his prospects of the advantages of getting from one place to another in a small amount of time and in comfort and in safety, in "such-and-such" a plane In other words, go after them along the idea of the plane being a valuable business asset to them

An eastern dealer who is handling a plane suitable for business purposes has met with a certain amount of success, by canvassing by letter a selected group of business houses In the letter he points out to them how they can profit in their own particular business by owning a plane, and illustrates his point with a few examples of other business houses which already possess planes He finishes up by inviting them, or their representative, to take a demonstration flight

Another dealer has made arrangements with the local high school, whereby the winner of a certain school contest is given a free ride and a certain amount of preliminary instruction This dealer, of course, conducts a flying school and that, incidentally, is considered one of the best ways to sell airplanes as it follows that he who learns on a certain type of plane usually selects that type of plane when he makes his own purchase

However, a danger to be avoided by dealers who conduct schools is that of forsaking their sales effort for the profit to be derived from teaching persons to fly It is a splendid idea for dealers to take on as many related activities as it is profitable, but to co-ordinate these activities in the ultimate idea of selling airplanes

Reverting for the moment to the question of airplane servicing, too much emphasis cannot be placed upon this most important subject It is not exaggeration to say that servicing will prove to be the backbone of successful airplane dealerships In the automotive industry it is

reported that many car dealers are making more money out of their service stations than they are out of selling new cars. Every single automobile dealer who made money during the year 1928 made a substantial profit from his service department. This may be true because of the fact that the automotive market is at present flooded with used cars. Yet on the other hand, it is a fact that labor is more costly than quantity production material, and the automotive dealer is cashing in on the labor in his servicing department. It is altogether logical that the airplane dealer should do likewise, when quantity production of airplanes reduces the cost of material below the cost of labor.

Incidentally, the service department is a source of many revenues such as labor, materials, accessories and the taking advantage of cash discounts on bills.

The cash discounts referred to do not include the paying for airplanes, as they are usually paid for by a deposit when the order is given and the balance when delivery is made. However, cash discounts do include parts purchased, accessories, etc. At first the usual 2% allowed on the payment of bills within ten days might seem a rather trivial item, yet over the course of a year it amounts up to a well worth while figure.

It is, of course, possible that a dealer may not be able to see his way clear enough to establish a service station of his own because of the cost of initial equipment and personnel to handle the station, and the manufacturer may not care to finance it for him at the start. If that be so, then he should make arrangements for his customers to obtain service elsewhere. If perchance the dealer is located at a flying field, that includes dealers of other planes, some sort of an arrangement might be made whereby one service station functions for the entire group of dealers. There are undoubtedly some manufacturers who would not favor such an idea, particularly if the other dealers happen to be representatives of competing manufacturers. Yet on the other hand, it is a rather good idea, in view of the fact that all manufacturers would be having their planes taken care of from the standpoint of servicing in that locality. Otherwise it might be the case of their "independent" dealer doing without the valuable item of service as an asset to his business. There is no reason why the aeronautic industry cannot benefit by the mistakes of the automotive industry. In the early days the automobile manufacturers were most jealous of each other and they would not even consider the idea of co-operative servicing. As a result their sales volume suffered through the creating of dissatisfied users because they could not obtain the service that they needed and were rightly entitled to receive.

Advertising, of course, plays its very important part in the business career of an airplane dealer. The advertising help that a dealer should expect from a manufacturer will be in the form of national advertising. The dealer may also participate in co-operative advertising supervised by the manufacturer. In other words, the manufacturer will place an advertisement or conduct an advertising campaign in a number of national periodicals and in them he will mention the names and addresses of his various dealers. The dealer will also receive assistance in advertising from the distributor similar to the assistance he receives from the manufacturer, with the exception that the distributor's advertising will be confined to his own territory and will not be of a national nature. The advertising that the dealer himself does is strictly retail advertising and of course there are many forms of retail advertising. One is direct mail advertising, or circulars and letters sent to prospective customers in the territory. There is one progressive dealer who has made arrangements with the local motion picture house to run a short reel of film of pictures taken in flight and pictures of airplanes in the air. Every so often a contest, or a lucky ticket contest, is conducted among the patrons of the motion picture house, and the winner is given a free ride in an airplane. Such methods are of course, just creating a certain amount of airmindedness that may lead to actual sales.

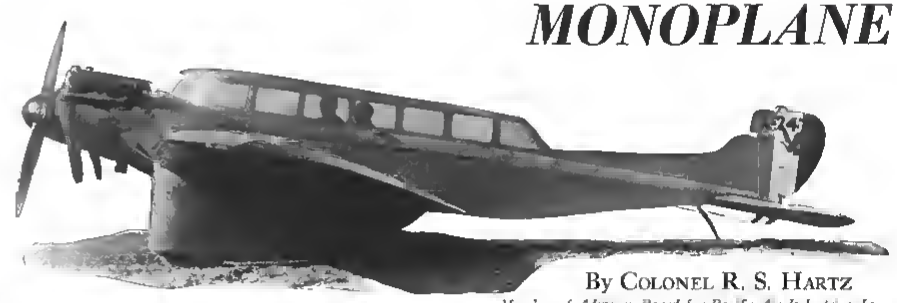
Another dealer has made arrangements with a local automobile dealer to display one of his airplanes in the automobile showroom. A member of the airplane dealer's staff is at hand at all times to answer questions and give out any information desired. As a matter of fact, this experiment has proved rather successful, according to the plane dealer. Then, of course there are various means of advertising that can be hooked up with a dealer's flying school, to say nothing of the advertising methods that can be applied to the merchandising of the dealer's related activities, such as parts, accessories, etc. Naturally, the dealer can count on advertising helps from the manufacturer such as flyers, booklets, catalogs, etc.

Of course, it is highly advisable for the dealer to take an active part in all local aeronautic shows and, perchance, it might be to his advantage to take space in the local automobile show. Whether these shows result in the making of actual airplane sales depends entirely upon the efforts exerted. However, they do create a certain amount of airmindedness and the creating of air mindedness is, of course, a most important step in the selling of airplanes. A dealer should also make it a point to attend all the major aeronautic conferences held in his locality or perhaps throughout the country. At least those that pertain to his business, or his activities.

It is also a good idea for the dealer to make periodic visits to the factory in order that he may personally contact the manufacturer that he represents, and become intimately acquainted with the making of the product which he is endeavoring to sell. The more of the picture that he can learn by heart the better he should be able to present his story to the prospective airplane owner.

It is not intended to convey the idea that the dealer should be a sort of superman, but rather that his own ability and effort will determine his successs in selling airplanes. He should, and rightly so, expect and receive the utmost assistance and co-operation of his distributor and the manufacturer. Yet, he should not go over the head of the distributor and contact only the manufacturer. If the distributor requires, and most of them do, that all dealings with the factory be made through the distributor, then the dealer must use his head and watch his step. However, he is really in business for himself and should bear in mind that it is the application of sound business principles, interspersed with original and practical ideas, and the co-ordination of all activities toward a common goal that will go far in making him a successful and progressive airplane dealer. If he be a born merchandiser, then so much the better. If he be not, which is usually the case, then he should take full advantage of the opportunities offered to make himself a merchandizer in the shortest space of time.

THE TUNISON "Scout" MONOPLANE



By Colonel R. S. Hartz

Member of Advisory Board for Pacific Air Industries, Inc. (Commander of the U. S. Army "Around the Rim" Flight)

Airplane Having Molded Plywood Structure Without Internal Bracing is Approach to Flying Wing Type

Probably one of the nearest approaches to the true flying wing airplane that has yet made its appearance in this country is the new molded plywood monoplane designed and built by M. C. Tunison. Passengers are carried in the wing of this plane, the engine mount is bolted directly to the wing and leading edge, and the fuselage, which carries tail stresses only, is mounted directly to the upper surface of the wing. Although a most remarkable plane in both appearance and construction, successful flight tests have proved the "Scout" to be a thoroughly practical airplane.

All major structural units of the Scout, with the exception of the engine mount, are of molded plywood without internal bracing. A full cantilever, low wing monoplane, carrying pilot and three passengers in an enclosed cabin, the sharply tapered wing with a very deep chord at the root most closely resembles the famous Italian Savoia. With a span of 36 ft., length of 31 ft., and overall height of 7½ ft., the "Scout" has a total wing area of 270 sq. ft. and a gross weight loaded of 3,650 lb.

Of the many unusual features found in this plane the most important is the basic structural system by which all parts are molded of plywood so as to carry all stresses in the skin without internal bracing. This construction produces an essentially one piece wing, hollow from tip to tip, and so strong that it may be freely walked on anywhere without damage. There are no spars within the wing and but four ribs in each side to prevent fluttering, all strength being built into the plywood shell itself, which is constructed of varying thickness according to the loads carried by the various portions. The fuselage also is of skin stressed, or monocoque type, and has no internal bracing other than a number of lateral bulkheads. Since it carries only the stresses of the tail group the fuselage is comparatively light, being mounted to the top of the wing and serving chiefly as a fairing around the passenger cockpit. Above the cockpit is mounted a cabin enclosure of streamline form which will be detachable on all standard closed models so that the plane may readily be converted from closed to open type.

One of the most noticeable features of the Scout plane is the construction of the streamline shrouds which carry the individual landing wheels. These molded plywood structures are mounted directly to the lower surface of the wing and completely enclose the wheels and shock absorbers. In addition to streamlining the landing gear, these shrouds also act as skids in case of landing gear failure, and it is believed that a safe landing could be made on an average field by the use of these skids alone.

The Scout was first flown by Jimmie Angel, on Dec. 21, 1928, from Eddie Martin's Aeport, Santa Ana, Calif. Many subsequent flights have been made by Angel, Eddie Martin, and a number of other pilots, all of whom credit the plane with exceptionally high speed, fast climb, and good maneuverability. Angel landed the plane after his first flight with a run of less than 250 ft. without brakes, in spite of the fact that the excellent streamline form of the plane gives it unusually high speed in a normal glide. As would be expected, the wood construction absorbs noise and vibration, and pilots report the Scout to be one of the smoothest and quietest planes they have ever flown. In addition to flying hands off, banking automatically, and recovering normal flight from stalls and other maneuvers, the Scout has shown a natural tendency to hold a true line when running on the ground even in a cross wind. Although unusually maneuverable, the Scout cannot be stunted violently, because of its wide wing, and with a gliding angle of better than ten to one with full load it is a strictly commercial plane.

Performances claimed by the makers are: high speed, 190 m.p.h.; cruising speed, 165 m.p.h.; landing speed 45 m.p.h.; climb at sea level, 800 ft. per min.; and absolute ceiling 24,000 ft. The experimental plane has been test flown with a 300 hp. Hispano H-3 engine but production models are to be equipped with any standard aircraft engine of 200-400 hp. Performance has been checked by the test pilot only and not by official ground timers.

Three models of the Scout are to be placed in production—the Scout, Junior, a two place open training plane of from 75 to 150 hp.; the Scout, Senior, a four place convertible closed or open craft of 200 to 400 hp.; and the Scout Cruiser, a five to seven place cabin monoplane

Photograph showing the instrument board and some of the controls in the Tunison "Scout" monoplane

of 400 to 500 hp. All will be of the same general type, varying only in overall dimensions, powerplant, and detailed equipment.

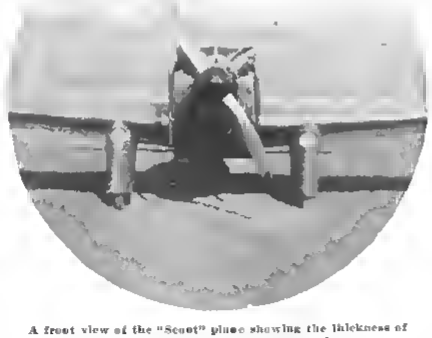
At the present time the Scout planes are to be equipped with any standard aircraft engine of suitable power, but a series of six engines has been designed by Mr. Tunison and it is hoped eventually to use these as standard equipment. The Tunison engine designs vary from 75 to 480 hp., and from two to eight cylinders. They are all of either opposed or X type, are all air and oil cooled and certain models will be geared and supercharged. None of these engines has yet been completed for testing.

Before manufacture is commenced on the Scout planes an intensive series of flight tests will be completed with a multiple manometer installation which records the pressure distribution over the wings, cabin and fuselage, at various speeds and attitudes of flight.

In designing the wing for the Scout, a careful study was made of accepted airfoils and their characteristics compared. The completed wing varies from a curve similar to the Gottingen 387 at the root to one similar to the Clark Y at the tip and embodies features of the Eiffel, R.F.C., Royal Italian, and U.S.A. series. An analysis of the forces on the wing surfaces at varying speeds and angles of attack was made prior to the actual designing, the magnitude and action of these forces was determined and the wing shape was then determined from the study of these characteristics. A set of curves of sheer, buckle, and moments were laid on the plan, and the thickness of the wing surface required to meet these conditions was then determined. With these factors decided a unit of strength was developed which would apply to both lower and upper surfaces of the wing, since these surfaces are the chords of the truss system. The hollow wing developed is built on the structural principle of the modified truncated cone and is a very efficient structure in weight-strength ratio, at the same time giving excellent aerodynamic qualities through the combinations of wing curves used. In practice the wing cone walls are built up of layers of $\frac{1}{16}$ in. veneer varying from 38 layers at the center with a thickness of $2\frac{5}{8}$ in. to five layers at the tips and trailing edges which have a thickness of approximately $\frac{1}{4}$ in., the leading edge being of maximum thickness. Thus the wing is a hollow case of plywood moulded to the shape desired and of the varying thicknesses demanded by the forces, the whole being a matter of patented procedure. One particular advantage of this construction is that, because of the comparatively great thickness and solidity of the wing surface, it is possible to mould it to a true wing curve at every point and to finish sand it to an almost perfect surface.

In developing this plywood construction, Mr. Tunison and his assistants believe that they have found a logical way to build a good plane at low cost. Ordinary Sitka spruce and cedar, either roll cut or sliced is used throughout, being fastened with the best casein glue by a process of heat and pressure. The tools and processes used are only such as have been developed and proved in large plywood mills, very little special equipment being required and little skilled labor being needed. In addition the moulded plywood construction can be easily waterproofed and fireproofed inside and out, as it is on Scout planes, cannot deteriorate, warp, or get out of line, absorbs vibration and noise, and will float indefinitely if the plane should be forced down in the water.

Three forms or moulds are employed in laying the plywood for the wing; one for the leading edge, and one each for upper and lower surfaces. The plywood is carefully cut and laid to meet the designed thicknesses and is built up by a process of doweling and of applying

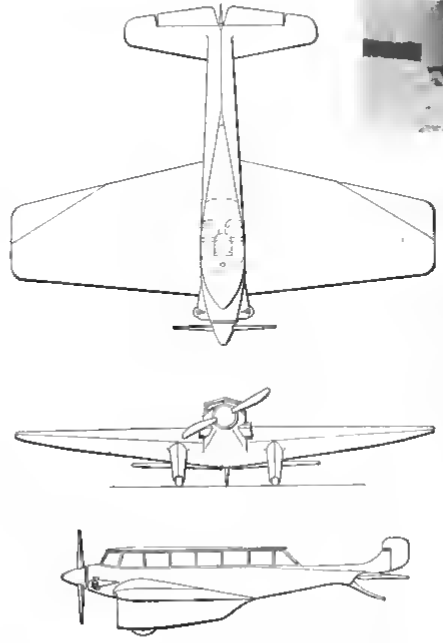


A front view of the "Scout" plane showing the thickness of the airfoil section of the wing ends

heat and pressure. The upper and lower sheets are assembled to the leading edge section in a master form which permanently sets the wing rigging, the rear edge is reinforced and the entire wing is glued, doweled, and riveted to withstand all forces. Thus the completed wing is one piece from tip to tip, is one simple structural system employing no beams, and is designed to carry 70 lb per sq. ft. loading (European standard).

There are four ribs in each wing to prevent fluttering complete of 600 lb. Ailerons, also of moulded plywood construction, are mounted to cutouts at the wing tips, being set at a sharp angle across the tip and trailing edge of the wing, which gives excellent lateral control. These cutouts are heavily reinforced for rigidity of aileron mounting. Ailerons are tapered in plan form with the maximum chord near the tip. Interior finish of wing and ailerons is by clear lacquer and fireproofing liquid. Exterior finish consists of Fabrikoid cemented smoothly

Right: Front quarter view of the plane with M. C. Tunison, designer and builder (left), and Jimmie Angel, test pilot (right). The streamline landing gear shrouds containing the landing lights are shown. Below: A three view drawing of the airplane



over the entire surface and heavily lacquered, providing efficient weatherproofing of the entire wing.

Also of moulded plywood construction, the fuselage, as previously mentioned, is of monocoque type with internal lateral bulkheads, and is built up over a form in an inverted U section. This fuselage is then bolted directly to the top of the wing through two metal L strips, the side plates of the fuselage being cut out to conform to the wing curve. The open side of the U, or bottom of the fuselage, is closed by the aluminum engine cowling forward of the wing, and by a flat plate of plywood from the trailing edge of the wing to the empennage. Although approximately rectangular in cross section, and with very little taper on either top or sides, the fuselage is tapered on its underside, fore and aft, to provide a smooth air flow around the entire structure. Since the engine is carried on a steel tube mount bolted directly to the forward portion of, and the leading edge of the wing, the fuselage terminates just forward of the cabin enclosure air fairing around the engine is completed by aluminum cowling. Stresses set up by the tail group in flight, or by the skid in landing, are the only loads which the fuselage must carry and these are taken by the flat side plates of the structure.

Passengers are carried directly in the wing, which has a maximum depth of over two feet at the center, a cockpit being provided by cutting away the upper wing surface, the lower wing surface acting as the cabin floor. Wing load stresses are carried around this cockpit cut out by a heavy reinforcement of wood veneer which is built in during construction of the wing, and the cabin is thus left entirely free of any internal structural members. The fuselage is 48 in. wide at the wing cutout and is cut away to complete the cockpit. Above this cockpit a cabin enclosure is mounted directly to the fuselage by means of a number of small bolts which are easily removed for conversion of the plane to open type. This cabin is offset to counteract engine torque automatically

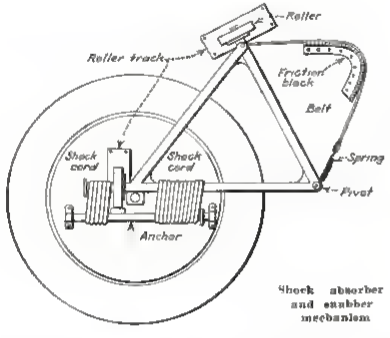
one being located in the root of the wing at the point of fuselage attachment on each side of the cabin, two over each landing gear shroud to transmit landing stresses to the upper wing surface, and one near each wing tip to insure rigidity of the aileron mounting. Aside from these four ribs there is no internal structure within the wing surfaces, no struts, beams, or wires being employed.

With a maximum chord of 12 ft., the wing tapers to a chord of 5 ft. 6 in. at the tip and has a total weight

and correct rudder action Entrance to the cabin interior is gained by a walk on the upper wing surface at the left side of the fuselage, and through a large trap door in the cabin roof In later models this trap door will include a large section of the left side of the cabin, making it extremely easy to enter or leave the plane The cabin enclosure is neatly streamlined and provides visibility in the horizontal plane through windows which are built in The forward two windows may be slid open at the will of the pilot A large window in the cabin roof provides an unobstructed view overhead and downward visibility is about equal to that in any low wing airplane In the present model a clover leaf seating arrangement provides for two passengers in rear and the pilot in front, but later models of the Scout Senior will carry four seats in pairs, with dual controls at the front two seats Ample baggage space is provided by a compartment in the rear of the passengers but inside the cabin

ALL SEATS are of form fitting bucket type built up of molded plywood and bolted to the cabin floor, and are heavily padded and covered with Fabrikoid The cabin interior is finished in mohair velvet, two dome lights are standard cabin equipment, and vents at the rear provide ample ventilation independent of the windows

Complete instrument equipment, including airspeed indicator, tachometer, ammeter, oil and temperature gauges, fore and aft, and lateral levels, ignition switches, light switches, throttle and altitude adjustment, is mounted on an illuminated vertical board directly in front of and a little below the pilot This board is covered with red Fabrikoid. Above and forward of the instrument board is a wide shelf which serves as a map desk. At the pilot's right hand is a tube passing through the wing for dropping flares, and also for assisting ventilation A fire extinguisher, first aid kit, log book, and map case are also carried on the right of the pilot At the left side of the

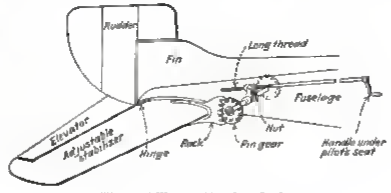


Shock absorber and snubber mechanism

cockpit is the stabilizer adjustment crank and the engine mount adjustment which will be explained later Navigation lights of neon tubes are standard equipment as is an engine light and an emergency oil light in case of battery or generator failure Landing lights are built into the leading edge of each wheel shroud and have adjustable beams controlled by the pilot The landing lights give a 2 000 ft beam while a 100 ft floodlight is supplied by special lamps in the reflectors

Controls are of conventional stick and rudder bar type, individual wheel brakes being operated by independent brake hand levers All control surfaces are balanced and mounted so that there is no whip or vibration in flight, control being by wire cables over Micarta faced pulleys to horns on all surfaces All cables pass through lead ferrules to prevent chafing, and all cable adjustments are made within the cabin All working parts of the control system are automatically lubricated for an estimated period of five years The stabilizer adjustment is operated by a steel tube to a nut and worm at the leading edge of the stabilizer, giving an irreversible gear mechanism that makes it possible to quickly change or to maintain any desired stabilizer position Changes in the line of thrust of the propeller, comparable to changes in stabilizer setting, may also be made by the pilot through a gear operating the adjustable steel tube engine mount

The engine mount is of welded chrome molybdenum steel tubing, and is hinged on heavy bearings to allow for adjustment of the line of thrust by the gear mentioned above Any engine of appropriate size may be carried on this mount Since a radiator was necessary with this engine, it was mounted below the engine and with the honeycomb set at a slight angle to the air stream for less wind resistance It is planned to use air cooled engines on all production models Exhaust manifolding is by twin pipes running from the forward ends of the engine manifold to a point each side of the cabin over the wing.



The stabilizer adjusting device

Bayonet silencers are fitted to these manifolds and have proved quite efficient

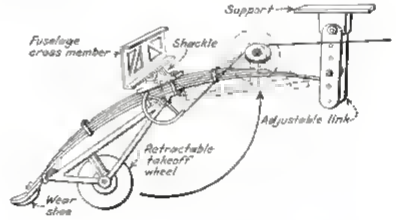
A 70-gal gasoline tank built in three sections is carried in the wing, oil is carried in a tank forward of the fuel tank on the engine mount proper A double firewall is provided between the engine and tanks This mounting of the tanks eliminates long or complicated fuel lines, all lines being of ¾ in stainless steel tubing with ground joints hand fitted, thus completely eliminating couplings, unions, or screwed joints Large water pumps and strainers are provided between the tanks and engine and positive feed is assured by wind driven pumps and emergency hand pumps to a gravity tank in the top of the cabin.

Engine ignition wires are shielded for radio installation and a radio antennae and counterpoise are built into each plane.

Wherever fittings are used they are of special heat treated steel, laminated at points of extreme stress, and all fittings and structural units are designed to international requirements for loads in excess of those required by the Department of Commerce Aside from steel fittings and aluminum angles, the only material used for

major units is veneer of either spruce, fir of cedar, fabricated with the best casein glue

Empennage members are of full cantilever type built of moulded plywood in the same manner as the wing and fuselage The horizontal stabilizer is mounted to the fuselage by heavy plain hinge bearings along the rear tip of the fuselage and trailing edge of the stabilizer, the leading edge being carried on the gear adjustment mechanism, With a span of 16 ft the stabilizer has a very



Tail skid and retractable tail wheel

high aspect ratio The elevator is of one piece construction mounted to the stabilizer by a piano hinge along the entire upper edge, and shielded at the tips by the stabilizer The rudder is of seven-ply, all wood construction and is mounted above the elevator to the vertical fin by ordinary piano hinges This fin is of unusual type since it extends from the rear of the cabin enclosure to the rudder thus providing the equalized air flow needed for good rudder action.

Moulded plywood shrouds of streamline form are mounted to the lower wing surfaces for landing gear attachment These shrouds are fastened to the wing surface by double L metal strips and bolts, the landing gear tread being 8 ft Within each shroud a single wheel is carried in a "figure four" steel tube mount, hinged at the rear and with rollers at each end of the wheel axle, bearing on guides within the shroud Shock absorbers using conventional wrapped rubber cord are used Moulded plywood wheels of 32 in diameter are equipped with 6 in tires, although later models are to carry a newly developed low pressure tire of unusually wide tread and with a rubber shock strip mounted to the rim within the tire to take any full deflation shocks which might otherwise damage the tire carcass Clearance of the shrouds from the ground is approximately 9½ in when the plane is fully loaded Since these shrouds are of fin-like action they have a certain tendency to hold the plane on a vertical bank according to pilots who have flown the craft. Another advantage of the shroud type landing gear is that it makes the loss of a wheel practically impossible, and even in the event of wheel failure a landing could be made on the shroud skids of the landing gear.

A FIXED SPRING TAIL SKID is carried on the present model but production planes will have a swiveled wheel 12 in in diameter and rubber tired, mounted to the steel spring A special adjustment is provided in the present plane by means of which the spring skid tension can be changed by shifting the position of the upper bearing so as to increase or decrease the lever arm action of the spring

Application is being made to the Department of Commerce for an approved type certificate on the Scout plane, and a demonstration tour is planned pending granting of this approval Many patents are pending on various features of design and construction of the plane.

It is believed by the makers that it can be more readily placed in production in quantities than existing types The structure has been reduced to only eight or nine principal members in place of the many more small parts which must be assembled in the construction of conventional planes These pieces are the landing gear and housings, the wing and ailerons, the fuselage and cabin, the engine mounting, the stabilizer and elevator, and the fin and rudder Few tools are required for the fabrication of these parts and it is not necessary to use highly skilled labor In building this first plane an experiment was tried in that only unskilled labor was employed, none of the workers having had previous aircraft experience and none being more than rough carpenters The result is a well constructed plane at a comparatively low labor cost

Considerable planning has been done by Mr Tunison toward factory layout and it is hoped that a factory with capacity of one plane a day may shortly be obtained Mr Tunison is well known for his years of aircraft engineering work and will retain his engineering connection with the company engaged in manufacturing Scout planes

Construction of the first Scout plane was financed by a group of Los Angeles men headed by Forest J Johnston

At the present time a company known as Pacific Air Industries, Inc., has been formed to take over the manufacture and sales of Scout aircraft Substantial financial background has been obtained and it is thought that a real manufacturing program can soon be instituted in an effort to place this plywood plane in quantity production and prove its value for commercial operation

Specifications on the Scout Senior as supplied by the manufacturers are as follows

Length overall	31 ft.
Height overall	7 ft 6 in.
Wing span	36 ft.
Maximum chord	12 ft
Minimum chord	5 ft 6 in
Wing area	270 sq ft
Airfoil section	Variable-generated
Weight of fuselage	135 lb
" " wing	600 lb.
" " cabin	40 lb
" " horizontal stabilizer	60 lb
" " fin	12 lb
" " rudder	12 lb
" " landing gear	145 lb
Total weight empty (approx)	2,259 lb.
Gross weight loaded	3,650 lb
Disposable load	1,391 lb
Powerplant	Any 200-400 hp aircraft engine
High speed at sea level	190 m.p.h
Cruising speed	165 m.p.h
Landing speed	45 m.p.h.
Take off run	250-750 ft
Time to take off	7-12 sec
Landing run without brakes full load	250 ft
Climb at sea level	800 ft per min
Service ceiling	18 000 ft
Absolute ceiling	24 000 ft
Range at cruising speed	600 mi

SHORT SKETCHES OF THE Aeronautics Branch PERSONNEL

William P. MacCracken, Jr., Assistant Secretary of Commerce for Aeronautics

THROUGHOUT the aviation industry thousands of letters are written weekly addressed to the Aeronautics Branch, Department of Commerce. Back come the answers, signed by various names—Secretary MacCracken, Director Young, the chiefs of divisions and sections—Howard, Hingsburg, Blee, Dr. Bauer, and on down the list. To some in the industry all but the first two mentioned remain just "names."

To reveal something of the men behind the names and to better acquaint the industry with the office heads of the Aeronautics Branch, the following brief sketches are written.

Assistant Secretary W. P. MacCracken—"Bill" MacCracken to hundreds in aviation—needs no introduction. Big of frame, hearty of manner and speech, famous for a ready smile that is more nearly a grin, Secretary MacCracken has an astounding capacity for work—a capacity that is often almost the despair of his secretary and two stenographers. A remarkable memory, a fine executive ability, a flier's active nature, and a lawyer's logical mind—these are but a few of the qualities that make up the man selected to be the first head of the Aeronautics Branch.

Though the carrying out of his policies is left to Director Young, and through him the division heads, Secretary MacCracken is by no means a figure-head. Without wasting time in routine details, he has still acquired a full knowledge of even secondary steps used in the various units of his Branch. And once noted, the information is tucked away in his mind forever, ready for instant use.

His personality has extended its influence into the offices he controls so forcibly that the geniality of "Bill" MacCracken will be found throughout the Aeronautics Branch. This spirit and the democratic good-fellowship which is also a vital characteristic of the "Flying Secretary" are in truth the keynote for the personnel of the organization. And in so imbuing his helpers with this spirit he has dissipated the dry, "red-tape," hundrum atmosphere that is too often found in Government offices.

Director Clarence M. Young occupies a unique and distinctive position in the Department. To him is given the putting into effect of all of Secretary MacCracken's policies—and formulating many of his own in controlling the Branch. Like MacCracken, he is a product of legal training combined with flying experience covering a period of 12 yr. In carrying on Department business he travels about the country in aircraft, thus maintaining his ability as an expert pilot.

In personality Director Young is quite different from his chief but quite as effective. There is a hint of repressed energy in his quiet, almost serious manner. He speaks crisply, with force to his words, though his voice does not rise. The seriousness is lightened by quick flashes of humor that reveal a somewhat complex nature.

Director Young is the "commanding officer" type whose men respect him, like him, and will follow implicitly. But they would never dream of trying to overrun him—there is a look in his keen direct eyes and an iron quality about his jaw which precludes that. He is a man who considers carefully and fairly when evidence is before him, makes up his mind, and does not change it, except rarely. He is a genius at organization, selecting competent men of correct personality for the work they will perform.

F. C. Hingsburg, chief engineer, Airways Division

Often "left in charge of the ship" when Secretary MacCracken is away, Director Young handles matters of policy as surely as his chief. He has a courtier-like manner but if occasion requires he can speak bluntly and straight to the point.

Coming into the Department at a most difficult time, he has built up an aeronautics licensing and inspection force in which "red tape" has been cut to the limit—and action made the watchword.

Under the general direction of Secretary MacCracken, he is in reality the Commanding Officer—serving as a captain of a flagship carrying an admiral. And upon no flagship will there be found better morale, efficiency, and goodwill than that fostered by the "Captain of the Aeronautics Branch," Clarence M. Young.

Edward H. Howard, chief of the Regulations Division, came to the Department after extensive service both in military and commercial flying, he is a major in the Air Corps Reserve, having organized the first Air Corps Reserve unit.

"Ed" combines, rather paradoxically, the hard working habits of a modern business man with the easy going disposition of a sportsman and artist. Given charge of the Regulation Division almost before he had signed up with the Department, he went over its work with a microscopic eye, noted duplication of steps, formed new plans, and started operations. But it was not a case of "new broom sweeping clean." "Ed" did not start to sweep till he was sure there was something to be swept. When he did sweep he kept on until the job was done. And he is still at it—liking the task, for he admits that his main reason for coming to Washington was to have a part in this interesting new work, that of promoting and at the same time regulating civil aeronautics. When the daily problems become routine, when the excitement dies down, undoubtedly he will be on his way—that rare type, an adventurer in business.

HOWARD has the mind and eye of a creator. It shows in drawings and sketches he fills in with easy, sure strokes. And that same creative mind has reduced routine work of his division by at least one-third, thus bringing about more output.

Being a pilot, knowing the commercial game, he has a ready sympathy for the man in the field. He is the opposite of the tyrant-in-office type sometimes found in such positions of power. And, like almost every one of the Regulation Division men, he has a fine sense of humor, which helps in the rough spots.

Howard's first aide, Gilbert Budwig, is chief of the inspection section. As such, he is well known to pilots and operators throughout the country. But perhaps even those who know him do not realize the experience he has packed into more than 12 yr of flying. He was flying before the War, and was soon chosen for an expert instruction task with the Army, ending up as stage commander of final review at Riverside. Then, on through work as test pilot, with the air mail, with commercial companies, "on his own," sky-writing, advertising, aircraft inspecting, flying all kinds of planes under every conceivable condition. Time in the air: Over 6,000 hr.

You could not get this from Budwig himself. Had this information not been set down, as required by law, in his entrance papers, he would still pass it by with "I don't just remember now."

Budwig is alert, business-like—and human. Knowing the grief that is often the lot of the commercial pilot, "Bud" is always on the lookout to help. He will give the other man the benefit of the doubt—and though he is constantly busy with new problems, he is approachable by any pilot who believes he has had a "poor deal." But that same long experience which makes him sympathetic also gives him a clear insight into any such problem, and the man who tries to "put one over" will ordinarily find Budwig one big jump ahead of him.

Jessie Lankford, chief of the licensing section, is the one man who used to get more "kicks" than any other official in the department. Some of the kickers used to hint—often very broadly—that "whoever was in charge of this licensing business ought to know something about flying." Wherein they were exactly right. He should—and does. Lankford started out in 1917 as a cadet in the Army—he was in France—he flies whenever he can now and he's a captain in the Air Corps Reserve. Besides which he is a wind tunnel expert, having served with the Bureau of Standards for four years.

Jesse is probably the best-natured "bird" in the Aeronautics Branch, or he couldn't have stood all the kicks so patiently. Short of help, money scarce for personnel other trials, students applying by the hundreds—he had plenty of alibis if he had wished to use them. But instead the usual answer went back, "sorry—we'll try to hurry things up." And the applicants who have visited his office to take exams or to check up on their cases, have found him surprisingly quick to drop his own work and expedite their papers if at all possible.

Jesse is so whole-heartedly interested in his work that every one of the 50 clerks under him has caught his contagious spirit, and is willing to run overtime week after week during the rush season.

DR. LOUIS H. BAUER—medical director of the Aeronautics Branch, is the leading American and probably world authority on aviation medical problems. That is a big statement, but it is thoroughly supported by facts. He was one of the first Army surgeons to undertake this work, he organized the flight surgeon school of the Army, he was commandant of that school for a time, and

By Donald E. Keyhoe

Maj. Clarence M. Young, Director of Aeronautics, Department of Commerce

he is author of "Aviation Medicine" the leading textbook on this important subject Doctor Bauer is a lieutenant colonel in the Reserve Medical Corps of the Army, Aviation Section

That's his background If you meet him at the Department or elsewhere in connection with official work you'll find him extremely competent, easy to approach—and, if you wait till all official matters have been completed, you may be fortunate enough to be included in his story-telling circle For Doctor Bauer has an apparently inexhaustible fund of stories, every one good and true—well, they're good, at any rate He is aviation's best raconteur, and if you don't know what that is, look it up for it isn't as bad as it sounds

Medical Director Bauer, as the head of the Department's 400 regularly appointed examiners, and final arbiter in case of doubtful applicants, is a brilliant man In his record you'll find "honor graduate, U S A Medical School," "honor graduate, Army School of Aviation Medicine," "graduate Army War College," and other significant statements

But "Doc" Bauer—possessor of a keen, dry wit, story teller supreme, is even more interesting If you don't believe it drop into his office sometime and ask him his latest

When L V Kerber first appeared at the Department, to take over his duties as chief of the engineering section, he very nearly started civil warfare, though unintentionally There's always one handsome man in every office Up to that time there had been considerable doubt about this matter—but when Kerber stepped upon the stage—well, stenographers began to make hash out of letters to senators, and worse seemed in sight However, within 48 hr someone discovered Kerber was married, and sadly the force went to work again

Aside from that Kerber has lived up to his reputation as being a most modern and expert aeronautical engineer A graduate of Michigan chief of various Army Air Corps sections at Dayton, such as Flight Test and Airplane Design, Aerodynamics Branch, designer of CO-5, TP-1, Daniel Guggenheim Fund professor of Applied Aeronautics at the University of Michigan—Kerber has had all the necessary experience to qualify him for the important work of deciding which planes are safe to receive Governmental approval before thus practically recommending them to the public

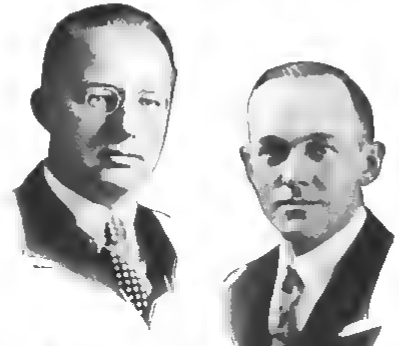
Kerber is extremely serious in appearance, and when he is in his office he works 60 min to the hour Quiet, extremely self-contained, he seems possessed of the ability to concentrate utterly on the subject in hand, to the exclusion of all personal matters He represents the higher class of engineer, to whom his science is an art more engrossing than anything else

"Shorty" Kintz is the desk-sergeant of the Department, in that he is the one who has to tell the flying lawbreakers just how much to send in and also "be quick about it." But in spite of his handicap which would seem almost bound to bring him a great deal of unpopularity in certain circles, Shorty has managed to keep a large group of friends who will swear by and not at him

He is a graduate of Georgetown Law School, has been admitted to the bar (not the type popularly known by many aviators) and was for some years connected as legal assistant to General Patrick when the latter was Chief of the Air Corps

Shorty can tell you offhand whether you are likely to be fined or merely warned in breaking Regulation No Z-13-a by flying an unlicensed plane under Brooklyn bridge with your best girl and using only one arm. Seriously, he is an expert on air law, and it is his duty to prepare briefs on cases of violations as well as to be on the lookout for possible improvements in the air commerce regulations He is chief of the Violations Section—and at one time when some violator sent him a "phony" check Shorty showed his master-mind by a brilliant letter which almost stated (but did not) that if good cold cash were not forthcoming the Department of Justice men would roll up to the door in 12 hr Shorty had accepted the check and was holding the proverbial "sack." The violator "came through" in a hurry Since then Shorty has not taken in any but certified checks

Harry H Blee is widely known in the country as a speaker on almost any phase of aeronautics In the rush days when every one was demanding information, Blee



Above Ernest Jones, chief of the Publications Section Right: Col Harry H. Blee chief of the Division of Airports and Aeronautic Information

was sent by Secretary MacCracken on a long tour during which he talked twice a day or more And they liked it so well that they asked for more, and the first thing he knew, Blee was selected as "pinch-hitter" for the Secretary himself when the latter suddenly found he could not fulfill certain important engagements

Blee is chief of the division of airports and aeronautic information He has had an extensive engineering education has been a state engineer in California, has served in both lighter-than-air and heavier-than-air services of the Army and has written numerous articles on aeronautics He is rated as an airship pilot and an observer in the Army He is also a lieutenant colonel in the Reserve

Blee is first of all extremely thorough When he takes up a subject he goes over it completely so that there is no point on which he can be "stumped" And he expects those under him to be just as well informed His division morale is high, because he stands up for his helpers and works for their advancement if deserved

From his public speaking he has developed a knack of easy speech and an ability to hold an audience even on a technical subject And, like Kerber of Engineering,

he is devoted to his work, and has little time for other matters. Probably he is one of the best informed men on aeronautics in the country

Ernest Jones, chief of publications section and editor of *Domestic Air News*, was connected with aeronautics probably earlier than any other man in the Department He published the first aeronautical magazine, he knew the Wrights, Curtiss, Beachey, and all the others who flew far back in the early days He had a mind filled with facts, figures, history, and incidents about the first days of flying that would make an absorbingly interesting book And he supports them with pictures of planes that in these days seem like the product of disordered imaginations

Jones is an inexhaustible seeker after data. And when he is on the trail of a statistic there is no stopping him He will get it if he has to call up the President to wire some stubborn operator who believes in shrouding his flights with mystery He is a hard worker, and can keep a dozen people busy without the slightest difficulty, like a city editor handing out rush assignments to reporters and re-write men And he has a supply of nervous energy that seems never to give out in his unabated rush after facts

If you can catch him away from the office at luncheon, or where there is no chance for a stray statistic to be lurking, he will relax and become most entertaining in drawing mental pictures of famous old veterans, describing some amusing incident with real art And if you can't remember something about that dim past and no

Above Gilbert Budwig, chief of the Inspection Section Left: Edward H Howard, chief of the Regulation Division

reference is found in any book, go ask Ernest Jones—it's a cinch he can give you the answer without a second's hesitation

The first unit of the Aeronautics Branch to get into action was the Airways Division, as the demand for lights was becoming a deafening clamor To Captain F C Hingsburg, until then a district superintendent in the Bureau of Lighthouses, fell the task of assembling pilots to survey routes and select sites, engineers to build fields, and create a vast caretaking force Hingsburg was not a flier, nor had he any special knowledge of flying But he knew lighting from beginning to end

Today the Airways Division functions with mathematical precision The airways are lighted, fields are operating, radio beacons working, new devices constantly under test All supervised by a man who did not know flying But he knows it now Hingsburg has flown over his routes, has inspected his own lights, no longer can a pilot say, "Well—but you don't understand it from the flier's angle."

In personality Hingsburg is a doer. A doer and a thinker, in addition to being a clever engineer. He is brisk but pleasant He has been at sea, and he looks the part of a sea captain. He has the manner of one accustomed to being obeyed, and also the manner of giving orders with pleasant firmness He is agreeable in conversation and he can explain his lighting science without intricate and baffling terms He is always looking "years ahead" to the time when air traffic will be thick enough to be a fair problem And it is certain that if he is still in charge of the Airways Division at that time, the airways will be operated smoothly, safely, and with the efficiency that is so evident in Hingsburg's every move and word

F J. Martel, chief of the communication section, is a picturesque figure because of his varied experience in flying Beginning with the Royal Flying Corps in 1916 he flew at the Front, was injured, flew again, joined the American Air Service in 1918, then was sent to Canada and later to the United States with the British Air Mission He developed the moving map for spotting from dummy cockpits; wrote most of the bombing bulletins, pamphlets on instruction and training and lectured at schools throughout the country. He has been cited, and has received the Order of the British Empire He developed the electrical synchronizing gear for firing through propellers, while in the Bureau of Standards, a special bomb sight, a smoke bomb to fake a burning plane in a spin, and installed the Ruggles orientator at several fields. He was with the medical section of the Army for a time, and then after the war, in 1919, left the service because of bad health

During the next year or two he visited foreign aviation fields, inspecting every important airport in Europe He then returned to this country, worked in commercial aviation, and came to the Department He is a lieutenant colonel in the Air Corps Reserve

It is an indication of Martel's modesty that this writer was acquainted with him for over eight months before learning any of the experiences he has had, and that these were obtained only after first hearing of them from another source

If space permitted, it would be easy to go on down the list, mentioning chiefs of other sections, their assistants, and the field men Those who have been so briefly sketched are the ones with whom the aviation industry comes more often in contact by correspondence The others—Miller, Stanton, of Airways, Taliaferro, Grover, of Airports and Information, Gazley of Engineering—and still others, will be met by any of the industry who go to the Department in Washington Each one has his specialized work and is peculiarly fitted by his background for that assignment

They're all glad to help when they can—and when you get to Washington drop in for a minute and see the men with whom you've been corresponding You'll find they're not just "desk fliers"—and maybe "Doc" Bauer will tell you a new one

Heating AND Ventilating FOR AIRPORT BUILDINGS

Article II: Selection of Heat-Surfaces to be Installed and Design of the Distribution System

By E. C. BLACKBURN, JR., M.E.

WE HAVE determined that 9,000 sq ft of direct radiation or its equivalent in some other form of heating surface will be required for each hangar Strictly speaking, the heat loss from the other hangars will not be quite as high as we found it to be in hangar "A" due to the fact that the others are more or less protected from the cold winds by the adjoining buildings The possible reduction in heating surface would be slight though so it is best to have the added factor of safety that the slight surplus gives.

The next step is to select the type of heating surface that is to be installed This requires considerable thought if the best results are to be obtained The purposes for which the building is to be used will determine this to a great extent

If direct radiation is to be used it must be located very carefully It must occupy as little floor space as possible It must not be placed on walls where it will interfere with any of the operations to be carried on in the building And at the same time it must be located reasonably close to the points where it will be most efficient in heating the building It is very difficult to locate the large amount of radiation required and still observe all these prohibitions.

There are a great many types of heaters on the market that were developed in the past few years for use primarily in factories, garages, etc These of course each have their own trade-name, but all of them are generally spoken of as "unit heaters" These heaters are admirably suited for installation in hangars for several reasons They do not occupy any valuable floor space, being installed high-up in the roof trusses or on the side walls high enough to be out of the way. Being out of reach they are not likely to become damaged by carelessness or accident thereby assisting in the reduction of the cost of maintenance. Last and most important they maintain a more even temperature throughout the space heated

With direct radiation the heat is quite likely to ascend to the roof and stay there leaving the floors cold and drafty The unit heaters consist of a heating element usually made of tubing having a spiral fin attached to the outside of the tubes The tubes are heated by the steam or hot-water being circulated inside them. The air in the building is forced through the heater by a small propellor type fan, mounted directly behind the heater. Thus the air in the building is constantly in circulation and reflectors on the front of the heater direct the warm air toward the floor This constant deflection downward of the heated air tends to maintain more even temperatures in the building than can be obtained by direct radiation

The installation of these heaters is shown at *H* Fig. 3 In Fig. 3 is also shown arrows indicating in general, the path taken by the air being circulated through the heaters A type of unit heater is shown in Fig 4 In Fig 6 is shown a reproduction of an actual installation of another make of unit heater

The majority of the manufacturers have rated their unit heaters in equivalent direct radiating surface so that in designing a system in which unit heaters are to be used the amount of direct radiation required is computed in the usual manner Then unit heaters may be selected that are equivalent to this amount of direct radiation

In our hangar we have found that we require 9,000 sq ft of direct radiation. We can select ten heaters, each of which has a capacity of 900 sq ft of direct radiation Thus gives the required total

These heaters are located on the plan as shown at *H* Fig. 1, and are shown in elevation on the cross section Fig 3.

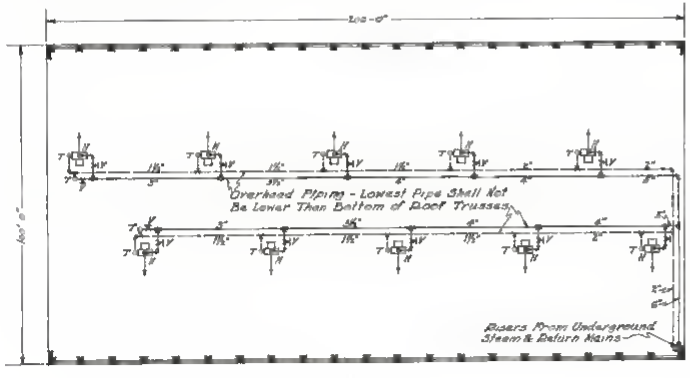


Fig. 1

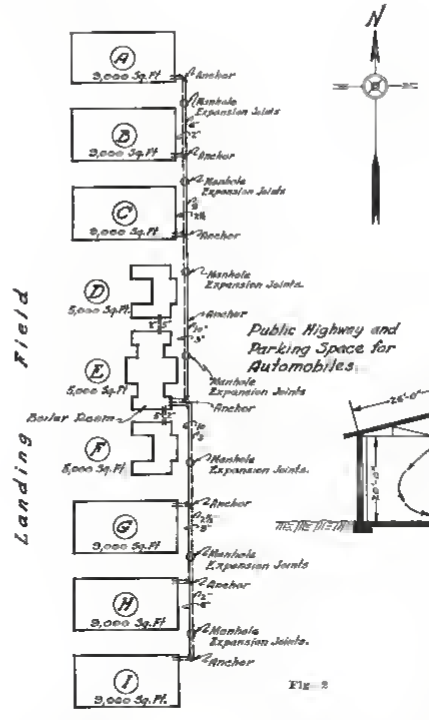


Fig. 2

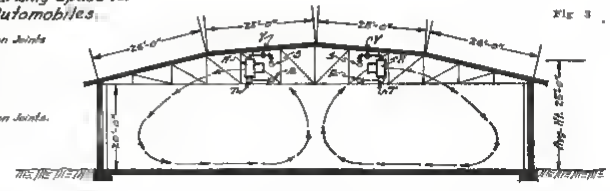


Fig. 3

All that now remains to be done in the hangar is to arrange a system of piping to convey steam to each unit heater and a return to convey the condensed steam back to the boiler plant.

The steam and return mains enter the hangar as shown in Fig. 1 in the Southeast corner These mains enter the building underground and rise in the corner and distribute in an overhead system of piping to the individual heaters as in plan view Fig. 1 and in elevation in Fig. 3.

IN SIZING these mains any table of pipe sizes that is found in a reliable handbook on this subject may be used By this is not meant that anyone not familiar with the subject can take such a table and lay out a successful system. Like all other tables, they must be intelligently used or they are worthless

The total equivalent direct radiation the main supplies at the point where it first enters the building is of course the total for the building or 9,000 sq ft. By referring to a table we find that this will require a six inch pipe Proceeding along this main we come to a point where it splits into two each supplying five heaters or 4,500 sq ft Referring to the table again we find that each of these mains must be five inch pipe Then going on we find one heater taken off the main This leaves a balance of four heaters or 3,600 sq ft to be served. From the table we find that this will require a four-inch pipe This method is carried out in this manner to the end of each main The main reducing as the load on it reduces The return mains are then sized by a similar process.

The steam mains should always pitch down in the direction that the steam is flowing in them, so that the condensation in the main will flow in the same direction as the steam This makes it necessary to provide some means of removing this condensation from the main Otherwise the main would eventually fill with condensed steam and being full of water of course no steam could be delivered to the heaters

A device for this purpose is indicated at *T* in Fig 1, at the very end of the steam main, and is known as a trap. There are many traps on the market some of which operate thermostatically and some of which operate on the float principle. Their function is to pass water but close against the passage of steam A combination of these two principles is embodied in the trap shown in Fig. 6 The float principle is utilized for relieving the main of condensation and the thermostatic principle is utilized for allowing air to escape from the main

Traps are used also on the individual unit heaters Their function is to hold the steam in the heaters until the heat has been removed from it and it again becomes condensation or water. As water it passes into the return main, then back to the boilers, where it is again evaporated into steam, starting another cycle. The traps on the unit heaters are shown at *T*, Fig. 1 and Fig. 3.

Valves shown at *V*, Fig 1 and Fig. 3, should be installed in the supply line to each heater and on the steam side of each trap This is necessary so that if repairs become necessary on any piece of apparatus they may be made without depriving the whole building of heat while the repairs are being made

A main service valve should be installed in the riser

in the corner for turning steam on or off the entire building when desired

The amount of heat wasted by having the heating system in operation when the large hangar doors are open is terrific. It is too much to expect that someone is going to remember to close the main valve each time it is necessary to open one of these doors. Therefore, it would seem advisable to develop some device to do this automatically. This could be done at a slight expense, and would pay for itself in a very short time in increased efficiency thereby reducing the operating costs.

Having completed the design of the heating system to be installed in the hangars the next step is to design similar systems for buildings *D*, *E*, and *F*.

As previously stated the interior arrangement of these buildings is so varied in different cases that it will not be practical for us to go into this question in detail. The amount of direct radiation required for each individual room in these buildings must be determined by the same process that we used for the hangar.

In most of the rooms in these buildings it will be preferable to install direct radiation. Some of the rooms will require mechanical ventilation and in these cases the air used for ventilation may be heated to a high enough temperature to also heat the room in addition to supplying ventilation, if desired.

All of the rooms in the buildings that are likely to be occupied by more than a very few persons should be provided with mechanical ventilation. This applies especially to class rooms, passenger waiting rooms and other large public spaces.

In ventilating these spaces the volume of air required will be determined by the number of occupants in the room. This volume of air must be taken in from outdoors and be delivered to the several rooms by a fan. The fans usually used for this type of work are of the centrifugal type, driven by electric motors.

Obviously some means must be provided to warm this air before it is introduced into the rooms. This is usually

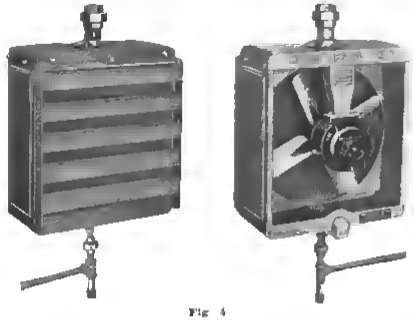


Fig. 4

accomplished by the use of heaters similar to the heating elements used in the unit heaters that were installed in the hangars. The size of the heaters naturally will depend on the volume of air to be heated.

In arriving at the total heating load on the boiler plant this air heating load must be taken into consideration also. The load in equivalent direct radiation may be determined by the equation previously given for determining the amount of heat required to warm the air in the hangar.

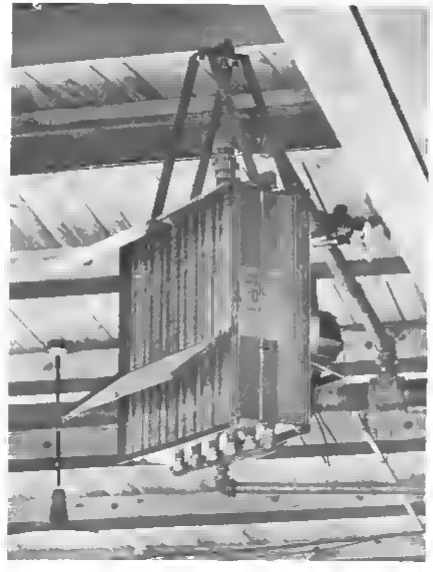


Fig. 5

It is usually most advisable to introduce the fresh air into the rooms through grilles or registers in the walls of the rooms at a distance of about seven or eight feet above the floor.

The air is delivered to these grilles or registers through a system of sheet-metal ducts provided with dampers for regulating the flow of air to each outlet.

In most cases it will be desirable to introduce this air into the rooms at a temperature of about 70 deg. F. In this system air is supplied at approximately room temperature for ventilation, while direct radiation is installed in the room in sufficient amounts to offset the heat losses.

In rooms where it is not desirable to install direct radiation the air used for ventilation may be heated to a temperature sufficiently high to offset the heat losses in cooling to room temperature. In a system of this kind the temperature of the air entering the room will be determined by the heat losses from the room.

All rooms to which air is supplied for ventilation must also be provided with vents for the escape of the air. The vent registers or grilles are usually located in the wall of the room close to the floor, and are connected to the outdoors by sheet metal ducts. These ducts must be provided with dampers to control the movement of air through them also.

Thus, air is taken from outdoors, is heated, delivered to the rooms, circulates through the room, leaves through the vents, and again returns to the outdoors. In this way fresh air is constantly being circulated through the rooms and if the system is properly designed, pleasing and desirable conditions will be maintained in the rooms. A system of this kind will eliminate stuffy air conditions, odors, etc. from the rooms.

Occasionally you may find systems installed in buildings where provision is made for the introduction of air into rooms but no vents are provided. These are invariably unsatisfactory because in a case of this kind, if the rooms are reasonably tight, it is just like trying to blow air into a bottle. You cannot blow more air into a room than can escape. Some air will escape through cracks around doors and windows but this is

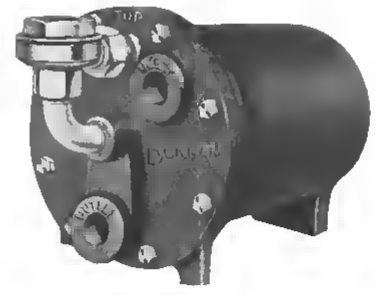


Fig. 6

never enough for any system of mechanical ventilation.

In addition to heating the air to be used for ventilation it should also be passed through an air filter or an air washer to remove the dust. It is very surprising to see the accumulation of dust on an installation of air filters, where the air that passes through them is to all outward appearances perfectly pure and free from dust.

THE INSTALLATION of equipment for cleaning the air used for ventilation in addition to bringing about more healthful conditions in the rooms, also effects quite a saving in decoration of walls, etc., due to the fact that they are not soiled by deposits of dust caused by unclean air being used for ventilation.

Toilets and similar rooms are usually equipped with an exhaust system of ventilation only. That is, no heated air is introduced into them. In this case a grille is usually placed in the door to the toilet so that air may be drawn from a corridor or large room through the toilet room, after which it is expelled to the outdoors.

It is imperative that some form of ventilating system be installed in toilet rooms. In some cases it may be deemed advisable to supply fresh air to these rooms similar to the way it is supplied to other rooms. If this is done an exhaust system should be used that will exhaust a slightly greater amount of air than the amount supplied. By doing this the toilet rooms are kept under a reduced pressure and this will successfully prevent odors from escaping into the other rooms adjoining.

Paint shops, dope rooms, spray booths and many other rooms used for special industrial applications will also require adequate exhaust systems to carry away poisonous fumes, for the protection of the health of the workmen.

Let us assume that we have calculated the amount of heat required for each individual room in buildings *D*, *E*, and *F* and have added to this the total amount of heat required for ventilation. We will assume that this total for each of these three buildings is found to be 5,000 sq. ft. of direct radiation.

We have now determined the total amount of heat required for each of the buildings shown in Fig. 2. These may be tabulated as follows:

Building *A*	9,000 sq. ft.
Building *B*	9,000 sq. ft.
Building *C*	9,000 sq. ft.
Building *D*	5,000 sq. ft.
Building *E*	5,000 sq. ft.
Building *F*	5,000 sq. ft.
Building *G*	9,000 sq. ft.
Building *H*	9,000 sq. ft.
Building *I*	9,000 sq. ft.
Total	69,000 sq. ft.

The size of the boiler plant naturally will depend on the total amount of heat to be supplied. Therefore we must determine this total before we can proceed further. We have just determined the total required for all buildings.

To this it will be advisable to add 10 per cent to cover miscellaneous losses. This includes losses of heat in the underground piping, etc. This amount will be 69,000x1.10 = 75,900 sq. ft.

There now remains but one item that must be included in our calculations of total heat requirements. That is the hot water heating load, or the amount of heat required for heating water for domestic uses.

The amount of hot water required per hour depends upon the number of fixtures to which hot water is connected, and the number of processes carried on at the airport that require the use of hot water.

We will assume that we have determined that this total amount of hot water required is 843 gal. per hr. The equation for converting gallons of water to be heated per hour to equivalent direct radiation is:

$$\text{Sq. Ft.} = \frac{GPH \times 8.33 \times Tr}{240}$$

Where GPH = Gallons heated per hour
8.33 = weight of one gallon.
Tr = Temperature rise
240 = Number of B.t.u. given off by one square foot of direct radiation

In our installation we will assume that the minimum temperature of the water in the winter months is 40 deg. F., and that we desire to raise the temperature of the water to 180 deg. F. Tr in the equation then will be 180 deg. — 40 deg. = 140 deg.

The equivalent direct radiation of our hot-water heating load therefore will be

$$\frac{843 \times 8.33 \times 140}{240} = 4{,}100 \text{ sq. ft.}$$

Adding this to our other heating loads we will have as the total load on the boiler plant:

For buildings	75,900 sq. ft.
For hot-water	4,100 sq. ft.
Total	80,000 sq. ft.

In other words, our boiler plant must be made-up of boilers and auxiliary equipment of sufficient size to supply steam to the equivalent of 80,000 sq. ft. of direct radiation.

GENERAL NEWS

Cleveland Pilots Make New Refueling Endurance Mark

Equipment and Oil System Aid Success

CLEVELAND (OHIO)—Worn out and exhausted by the efficiency of their Stinson-Detroiter plane and Wright Whirlwind engine, Byron K Newcomb and Roy L Mitchell, Cleveland flyers returned to earth at f2 39 50 a.m, July 6, after remaining in the air seven and one-quarter days

As a result of their long flight they are the new holders of the refueling endurance flight record Their mark is 174 hr and 59 sec. This is 1 hr 28 min 59 sec better than the previous mark held by Reginald Robbins and James Kelly, Fort Worth, Tex flyers

Both flyers asserted their plane and engine was good for another 100 hr of flying In previous refueling attempts the flyers came down because of mechanical trouble but this time it was human exhaustion

Oil Engine From Cabin

The flight also brought out a number of new technical points that should prove of interest to manufacturers and aeronautical engineers The two flyers used for the first time an oiling system that was operated from the instrument board inside of the plane This eliminated the need for a cat walk and the hazards that go with it

The special oiling system was operated by eighteen small Alemite contact points on a panel located just below the center of the instrument board. From each contact point led a copper tube to the rocker arms of the cylinder. Two of these tubes lead to each of the nine cylinders of the Wright J5

The oil was forced to the rocker arm through an Alemite gun The two tubes leading to each cylinder were taped to keep them from breaking due to vibration Both men agreed that the system worked perfectly

Make 24 Contacts

During the flight 24 refueling contacts were made They required an average of 30 min, the actual transfer of gas from one plane to another consuming on an average 1 min 50 sec At the start of the flight 100 gal of gas was transferred but a dent in the emergency tank of the Stinson refueling plane only enabled the refueler to transmit 85 gal at the conclusion of the trip The dent was caused by suction in transferring the gas

A 60-ft hose 2 in in diameter, was employed to transfer the gas The plane averaged 80 mi an hour during the flight, carrying Mitchell and Newcomb about 14,500 mi in the circular path over the airport

Averaging 5 gal of oil every 10 hr the flight consumed 87 gal. The plane also used 1 914 gal of gas, averaging 11 gal per hour The Stinson usually makes 14 gal an hour

Two Stinson Detroiters were used as refueling planes, the first being washed out in a heavy storm This was the same plane in which Eddie Stinson and George Haldeman set a non refueling record in Florida

Equipment Employed

Included in the equipment used in the flight were the following

Stinson Detroiter five-passenger cabin monoplane, Wright Whirlwind J5, Pioneer instrument board Alemite lubricating system, General tires Bendix wheels, Oleo struts Hamilton propeller, Texaco gas, Kendell oil, TP push grease (Standard Oil Company), Luxor goggles, Amco hose RCA radio, BG spark plugs, Ever Ready flash light, Scintilla magneto, Willard battery, Air Wax cleaner Very flares, Fire fighter fire extinguisher and Irving air chute.

Plane Smokers May Start Fires

SPOKANE (WASH)—Lighted cigar and cigarette stubs, thrown from planes, may cause forest fires, it has been discovered by extensive tests conducted here by Jack Yost and Lieut A. H Lyon, of the Mamer forest patrol Forestry officials have issued a widespread warning to pilots and air passengers against throwing burning stubs from planes.

Rochester Show Sanctioned

ROCHESTER (N Y.)—Sanction of the Aeronautical Chamber of Commerce for the aircraft exhibition to be held in connection with the Rochester Exposition, Sept. 2-7, has been received.

Aviation Consolidated Organized in Merger

LAKE PLACID (N Y)—Aviation Consolidated, Inc., is announced here as a new combination which includes Aviation Training and Transport, Inc, Royal Palm Airways, Palm Beach Airport, Inc, Palm Beach Flying Service, Inc Lake Placid Airport and Orlando Aviation School, Inc, and Plattsburg Airport, Inc Maj Lorillard Spencer, formerly head of the Fokker company, is president of the new organization.

With plans to operate an aerial charter service to New York, Montreal and Westport, the firm has acquired exclusive air landing rights to all Hudson River Day Line docks, it is said Furthermore, plans are underway for aero instruction for women at Lake Placid and Palm Beach, as well as for an aviation camp at Plattsburg and a junior training school for boys under 16 at Lake Placid

Besides Mr Spencer other officers of Aviation Consolidated Inc. are B G Dahlberg, of Chicago, chairman of the board, A V S Olcott, of New York, vice president, William Knabe of New York, executive vice-president, Samuel R. Bell, of Larchmont, treasurer, and Stanley E. Gunnison, of New York, secretary.

As We Go to Press—

NEW YORK (N Y)—As AVIATION goes to press, the Buhl Airsedan, called the Angeleno piloted by L W. Mendell and R B Reinhart was nearing a new refueling endurance record at Culver City, Calif They were aiming at the mark of 174 hr 59 sec recently set up at Cleveland and were within a few hours of success The 'Untin Bowler, which started from Chicago July 3 in an attempt to fly to Berlin by way of the sub Arctic, was believed waiting favorable weather at Port Burwell, Cape Chidley in the Hudson Bay region Roger Q Williams and Lewis A Yancey were believed still in the air on a flight from Old Orchard Beach, Me., to Rome They took off in a Bellanca, named the Pathfinder, at 8.48 a m, local time, July 8

Type Certificates Granted

WASHINGTON (D C)—Four Approved Types Certificates were issued by the Aeronautics Branch during the week ending July 6 as follows No 169, Lockheed Vega, 6PCLM, Wasp, 2465, 1568, 4033

No 170, Kreutzer K-3 6PCLM, 3 LeBlonds 2846 1654, 4500

No 171, Kreutzer K-2 6PCLM 2 60 hp LeBlonds, 1 90 hp LeBlond, 2697, 1748, 4445

No 172 Bach 3CT8 10PCLM, 2 R5 40's f Hornet, 4785, 3195, 7980

Change Name Of Mahoney-Ryan

ST. LOUIS (MO)—Phil DeC Ball has retired as president of the Mahoney-Ryan Aircraft Corporation and the name of the company has been changed to Ryan Aircraft Corporation, it was announced here July 2, following a conference in St. Louis between officials of the local firm and of the Detroit Aviation Corporation, with which it recently merged.

Mr. Ball will be succeeded by Edward S. Evans, of Detroit, president of the holding company Mr Ball, together with Harry F. Knight, Thomas N Dysart and Harold M. Bixby, will be the St. Louisans on the board of the Detroit Aviation Corporation

Lieut. James Work, aircraft designer, will become vice-president of the Ryan Aircraft Corporation with offices in Detroit John C. Nulsen will remain general manager and will be the chief executive officer stationed at St Louis It is understood that the company will make smaller planes in addition to its six-place brougham

Mr. Evans announced definitely that headquarters of the Ryan concern will be kept in St. Louis It also is considered likely that one or more of the other firms merged with Detroit Aircraft will be located here.

Building and Branches for Pioneer

NEW YORK (N Y)—Branch offices in Wichita, Kan, and Chicago, Ill, have been established by Pioneer Instrument Company, it has just been announced by officials of the firm In addition, a new unit is being added to the Brooklyn factory This building, which will be known as No 9, is now under construction in the rear of building No 2 The new structure is to be four stories in height and will measure 88 ft in length and 26 ft in width. Another floor is also being added to building No 3, which is occupied by the foundry calibration department and the sales office The Chicago branch office, which is in charge of Alan G. Binnie, is located at the Municipal Airport The address is 5034 West 63rd St Clare V Bunch is in charge of the new Wichita branch, located in the A V I Building, 420 West Douglas St.

Gets Exclusive Delta Agency

MARSHALL (MO)—Nicholas-Beazley Airplane Company, Inc this city, has taken over the exclusive distribution of the new Delta landing lights recently placed in production by Delta Electric Company. Marion Ind., it has just been announced The lights are 18 in long and have a 5½ in reflector

To Form Foreign Branches

LOS ANGELES (CALIF)—Foreign subsidiaries in Mexico City and Chile are to be formed by the Aircraft Finance Corporation of America, according to A. O Hunsaker president.

Cleveland May Add Space

CLEVELAND (OHIO)—Late reports state that contracts for 192,000 sq ft of display space, or 96 per cent of the total floor space at Cleveland's auditorium, have been received from firms planning to exhibit at the 1929 Aeronautical Exposition. Contracts already received number about 155, and arrangements are now under way to provide an additional 20,000-30,000 sq ft to meet the large demand

Wichita Designers Form Separate Firms

WICHITA (KAN)—D F Fechtman, who designed and superintended the building of the first all-metal cabin biplane built in Wichita, and R. B Buckley, who financed the building of the plane, have announced plans for separate companies Both will build low-winged metal monoplanes

Charles E Quick and associates, who organized the Quick Manufacturing Company several months ago have joined forces with Fechtman The name of the company has been changed to the Metal Aircraft Corporation and the plane to be designed by Fechtman will be known as the "Metalair

Buckley's company, which has not been completed, will manufacture the plane which already has passed rigid air tests. It costs less than $6,000 to build the four-place plane. This includes the cost of the Kinner engine and the jigs and forms that will be used in making other planes The first all-metal is said to have a cruising speed of 100 m p h.

Approve Moth-Curtiss Merger

NEW YORK (N Y)—Directors of the Moth Aircraft Corporation have approved a merging of the firm with the Curtiss-Wright group, according to a statement issued here No definite announcement as to the rumored inclusion of Travel Air in the organization, on the other hand, is available as we go to press According to the statement of Curtiss-Wright Corporation, approximately 6,500,000 of the 12,000,000 authorized shares of capital stock and 1,050 000 of the 2,000,000 authorized preferred stock will be outstanding, if the consolidation plan is accepted by the stockholders of all the companies involved in the new combination

McAdoo Heads Hawaii Firm

LOS ANGELES (CALIF)—Hawaii Airways Company has been formed, with William Gibbs McAdoo as president, for the operation of a daily plane service between the three principal islands of the Hawaiian group Three tri engined Fokkers have been ordered and it is expected that the service—connecting the islands of Hawaii, Maui and Kauai—will be under way about September 1 Nathan Newby, Jr, of this city, is one of the directors

Government Reports Plane Building Doubled

WASHINGTON (D C)—Aircraft production in the United States during the first six months of the year was nearly double that of the corresponding period in 1928, it is revealed by a report just issued by the Aeronautics Branch, Department of Commerce.

Two thousand and forty-five airplanes were assigned identification marks by the Aeronautics Branch this year in the period ending June 30 as compared with 733 in the same period in 1928, the report shows This is an increase of 1,312, Since identification marks are assigned aircraft before licenses are issued, the number of planes identified in a given period is regarded as an extremely good indication of production

Other records were broken also in the last six months, according to the report On June 30, there were 6,254 licensed aircraft, 4,821 identified planes, 6 169 licensed mechanics, 18,550 student pilots and 7 881 licensed pilots Of the licensed planes, 2,381 were registered in the first six months of the year as compared with 1,194 for the first six months of 1928 It is interesting to note also that 2 515 transfers of title were recorded this year

The number of permits issued to student pilots in f929 was 8,288, while only 2,047 such permits were issued in the first six months of 1928. The increase in the number of licensed mechanics was relatively small. One thousand two hundred and twenty-seven mechanic's licenses were issued in the first half of 1928 and for the same period this year there was an increase of but 313 The number of pilots licenses issued, though, jumped from 1 172 in the first six months of 1928 to 2 419 in the same period this year. License renewals totaling 3,007 were also granted

Finance Firm Backs Mamer

SPOKANE (WASH)—The International Air Transport Company, of Spokane, a finance corporation for the Mamer Flying Service and the Mamer Air Transport Company, has been formed. Clarence 1 Paulsen, financier and head of the Mamer service, is president, Nick B. Mamer is vice-president and J Newton Wakefield, secretary. The organization is preliminary to launching service for passengers and express connecting a score of Northwest cities with four tri engined Fords Capitalization is $900,000

Clevenger Forms Mexico Branch

TULSA (OKLA)—Cloyd Clevenger, vice president of the Garland aviation interests in Oklahoma has established an aviation school at Mexico City Mexico, as a branch of the Garland-Clevenger School of Aviation One branch has already been established at Amarillo, Texas

Blee Makes Plea For Uniform Laws

Colonel and P. G. Johnson Speak at Boise Meeting

BOISE (IDA)—One of the chief needs of the nation is uniform air legislation, declared Col. Harry H Blee, chief of the Division of Airports, U S Department of Commerce, in an address to the governors of eleven Western states on the first day of the Air Commerce Conference here, July 8-10 "The matter of state regulatory legislation is a very important one," stated the Colonel. "The Department of Commerce has given this subject much thought and has prepared several suggested forms of state laws." These forms, it was pointed out, are available on application to the Aeronautics Branch

The Air Commerce Conference was called here by Governor Baldridge, of Idaho, because of the inherent interstate nature of air commerce, in an effort to formulate plans for a permanent western organization whose objectives are uniform state legislation, establishing of interstate airways, and state adoption of regulations pertaining to government licensing of planes and pilots Beside governors, attorneys general, secretaries of state, highway commissioners, and directors, and law enforcement officials attended.

Resort to Intrastate Flying

"Under provisions of the Air Commerce Act, unlicensed aircraft and airmen engaged in air commerce in any way whatsoever, are obliged to confine their operations to the borders of a given state in which there are no limiting state laws," declared Colonel Blee. The results are more or less obvious Thus far, at least, not all aircraft and airmen are airworthy or competent Some are disapproved for various reasons when they are inspected or examined by the field representatives of the Department of Commerce In such cases there is but one alternative either to acquire airworthy aircraft or to improve their ability as airmen, and that is to resort to *intra state* operation in a state having no law or the incorrect law

"The remedy, under existing Federal law, requires suitable state legislation—legislation which, among other things must take into consideration the imperative need for uniformity throughout the United States in the matter of airworthiness of aircraft, competency of airmen, and, most particularly, in the operation of aircraft in the air"

Johnson Urges Airport Improvements

In another address, P G Johnson president of the Boeing division of United Aircraft & Transport and vice-president of the Aeronautical Chamber of Commerce, Northwest Division recommended that "each of the states represented at the conference designate an official to examine thoroughly the status of aviation in his commonwealth, with reference particularly to the protection of life and invested capital."

He further recommended that the state officials appointed select a smaller executive committee, the chairman of which shall act as the point of contact for the aircraft industry, and that the executive committee consult with commercial aviation interests and municipal authorities to the end that public airports now projected may fit more intelligently into the system of national air routes under the scrutiny of the Federal Inter-Departmental Committee on Airways. Mr. Johnson's final recommendation to the conference was that it go on record "as urging municipalities to establish airports"

West Pointers Seek Air Corps School

WASHINGTON (D C)—One hundred and fifteen of the 297 cadets that were graduated this year from the U S Military Academy at West Point, N Y, have requested assignment to the Air Corps, it has just been announced by the War Department. So far, 101 have successfully passed the flight physical examination, and it is believed that the remaining 14 will have the minor physical defects, noted on the first examination, corrected so that they may enter the Primary Flying School, Brooks Field, San Antonio, Texas, before November 1

Reduce Hisso Eaglerock Price

COLORADO SPRINGS (COLO.)—Because of lowered production costs, due to increased production, the price complete of the Eaglerock biplane powered with the 150 hp Wright Hispano Suiza "A" engine has been reduced from $4,000 to $3,500, effective immediately, according to announcement by Justin A McInaney, sales manager of the Alexander Aircraft Company Action of the company in effecting the 12½ per cent reduction was also influenced by a desire to clear the assembly line for the new Alexander Bullet

Change Universal School Names

MINNEAPOLIS (MINN.)—Effective July 1 all branches of Universal Aviation Schools discarded their individual names and became known simply by the city in which they are located, V. L Jones, superintendent of the Northwest division of the school system has announced

Select Curtiss-Caproni Plant Site at Baltimore

BALTIMORE (MD.)—Site of the new Curtiss-Caproni plant, initially to cost in the neighborhood of $1,000,000, has been selected here, in the Dundalk section Production of large Caproni transport craft is scheduled, with finished airplanes promised by the first of the year

The location selected for the new plant is on the railroad lines immediately adjacent to the new Baltimore Municipal Airport in course of construction, and a short distance from Logan Field, now used temporarily as a municipal airport and to which the Curtiss-Caproni Company will have access with airport privileges The new plant will be approximately 25 min distant from Baltimore City Hall and is reached directly by car line The Dundalk section of Baltimore is directly on the main ship channel opposite Curtiss Bay

The plant will occupy a portion of 25 acres leased from the City of Baltimore for 60 yrs As this site has water on three sides of sufficient depth to be reached by new airplane carriers, it will be an excellent position for the delivery of planes.

Bids, it is said, will be advertised shortly for the construction of the steel and brick factory Many new and unique designs for convenient manufacture and assembly of planes are promised

"Land" Plane on Los Angeles

LAKEHURST (N J) — Officers at the Naval Air Station here were elated over the successful completion of the first of a series of tests in which a one and a half ton airplane was successfully "landed" on the U S S Los Angeles while in the air and took off again The plane was flown up under the dirigible so that a hook on the upper wing of the plane engaged a bar dropped down from the airship This was accomplished three times These are said to be the first tests of the sort ever conducted by the Navy It is believed that the work is being conducted in preparation for maneuvers of heavier-than-air craft with the two new dirigibles of 6,500,000 cu.ft capacity, which are now under construction These two new airships will have small built-in hangars enabling them to carry planes for both offensive and defensive purposes.

Universal Stocks Engine Parts

ST LOUIS (MO.)—Universal's aeronautical supply department at Lambert-St Louis Field has installed a complete stock of parts for Wright, Pratt & Whitney, Kinner, Warner and LeBlond engines It also has one of the largest stocks of OX-5 and Hispano engines in the country Walter Hays, sales manager for the department, reports a heavy sale of materials to Canada and Mexico and an increasing demand for glider supplies

Make Glider Flights At Cape Cod School

SOUTH WELLFLEET (MASS.)—Although delay in completing buildings made it impossible to have formal opening ceremonies for the school of the American Motorless Aviation Corporation on Monday, July 8, a training glider was used for a number of preliminary flights on the preceding Sunday Unfavorable winds permitted only short glides, but a number of visitors were able to experiment with the sport of gliding for the first time after demonstrations by Heinrich Knott and Rolf Chlingensperg the company's chief pilots and instructors who have come from the great German gliding center and school in the Rhon mountains The possibilities of gliders for training novices were well displayed when several rough landings, including one on a wing tip, were made without damage

Among those who tried their hands in solo flights were W Irvin Bullard, former president of Colonial Air Transport and of the Boston Chamber of Commerce, Capt. Richard Mackie, chief pilot of Colonial Air Transport Edward P Warner, editor of AVIATION, and a number of others, including some who had never before touched the controls of any sort of aircraft

The glider camp has been established near the crest of the steep sand bluff, over 100 ft in height, that faces the sea. Prolonged soaring flights will be possible only with easterly winds blowing up the slope

The school is under the management of Maj Vergne Chappelle and Maj Clarence E. Doll of the American Motorless Aviation Corporation. The gliders used in the first operations have been brought from Germany by Mr Knott.

Plan Indiana Tour

INDIANAPOLIS (IND.)—The Indiana Aircraft Trade Association is arranging the first Indiana goodwill air tour to be held September 16-21 A committee, named by President H. Weir Cook, general manager of Curtiss Flying Service of Indiana, includes H. C Brooks, Indianapolis, chairman; C. F Cornish, Fort Wayne; Ellis Fish, Bedford; L I. Aretz, Lafayette, Paul Cox, Terre Haute, L. D. Miller, Richmond, and Clyde Shockley, Kokomo Approximately forty planes are expected and about twenty cities will be visited.

Texas Aero Plans Move

DALLAS (TEX.)—The Texas Aero Corporation, a $1,000,000 concern, which has been operating several years in Temple Tex will transfer its factory to Dallas and enlarge its output, according to George W. Williams of Temple, president of the concern The company last week purchased a four acre tract adjoining Love Field, the municipal airport, and will build on this site Mr Williams said

United Reports Net Profit

NEW YORK (N Y.)—Net profits of United Aircraft & Transport Corporation for the five months ending May 31 have been put at $3,327,414 after all charges, including Federal income tax. Demand continues to mount, it is reported, with orders totalling $10,000,000 on the books of the equipment firms of United.

Report L. and H. Firm Merging With Colonial

HARTFORD (CONN.) — Although neither company is quite ready to make a definite statement, it is reported here on good authority that L. and H. Aircraft Corporation will be merged with Colonial Flying Service, a subsidiary of Colonial Air Transport, of The Aviation Corporation group Colonial has recently bought 50 Fleet training planes to be used exclusively for primary training at Buffalo, Schnectady and Utica, N Y, and in other centers where Colonial plans to establish schools

In the proposed merger, the L and H company will keep its present officers and identity, it is stated, but its pilots will instruct for Colonial Lieut Carl A. Dixon, operations manager of the company, and Lieut. Charles L Wright, chief pilot, are already reserve pilots for the Colonial air mail run between New York and Boston

Great Northern Buys Sergent

DULUTH, (MINN.)—The Sergent Flying Service and Sergent School of Aeronautics, this city, has been purchased by the Great Northern Aviation Corporation, with headquarters in St Paul Roger Sergent, president of the company has been retained as general manager, with offices in Duluth The new concern, besides, operating the Duluth flying school, will distribute and sell Eaglerock planes

Buys Interstate Airways

HARTFORD (CONN.)—Negotiations have been completed for the purchase of the Interstate Airways, Inc., by Milton Moore of Yonkers, N Y The Interstate company was owned by a group of Springfield, Mass. men headed by Arthur E Center and Guy Moran The company operated from Hartford and Worcester, Mass Mr Moore states he will lay stress on flying training

Plan Three Office Planes Monthly

ST LOUIS (MO.)—Mahoney-Ryan Aircraft Corp has started regular production of an office plane at the rate of three craft a month The plane, which carries four passengers and a pilot, is equipped with dictaphone, office desk filing equipment, desk and reading lights thermos bottle set electric cigar lighter, shelves for books and other accessories

Government Testing Dusting Possibilities

WASHINGTON, (D C.)—Meeting the demands of the cotton industry for faster and better methods of applying insecticides against the boll weevil and other insects, the Bureau of Entomology is expanding its studies of dusting by airplane now being carried on at the Tallulah, La., agricultural experiment station. Although infestation has been comparatively light in recent years, it is pointed out, a sudden increase in insect pests would create a need for rapid eradication over wide areas to which end planes doubtless would be called to play a leading part The Bureau is working to provide basic data showing how plane dusting can be made most effective toward such an emergency or in solving the routine insect problems of the cotton growers.

Work for the current field season includes studies of powder distribution under different atmospheric conditions The effective width of swaths laid down by a plane are known to vary as affected by climatic factors Obviously the effect diminishes from the center outward The actual ground distribution is ascertained by microscopic studies of particles gathered on glass slides exposed in the fields

Experiment With Paris Green

The design of distributing hoppers to spread the insecticides is also under investigation. Different chemicals require different methods Studies include calcium arsenate, used against the boll weevil, sulphur against the cotton leaf worm, and nicotine dust against the aphis or plant louse These insecticides are sometimes used in combination but usually are employed singly against a given pest.

The use of Paris Green sprayed by airplane to kill malarial mosquitos in swamp areas which could not be covered by ground equipment is also under experimentation If successful this will be particularly useful in rice fields. it is pointed out The anopheles larvæ are surface feeders and indications are that it will be commercially feasible to kill them by particles of Paris Green floating on the water

Another phase of insect study is the collection of flying insects in the upper air by means of fly paper carried in devices attached to airplane wings. Thus it will be possible to obtain data concerning the migration of important agricultural pests

Noran Buys 50 Szekely Engines

SAN FRANCISCO (CALIF.)—Contract with the Szekely Aircraft & Engine Company for fifty airplane engines was announced recently by Robert E. McGill and L. M Finch, of the Noran Aircraft Company The engines, all three-cylinder, air-cooled radials, are to be used as standard equipment on the light single-place monoplane the Noran Company is turning out

Navy Orders 152 Planes and 168 Engines

WASHINGTON (D C.) — Contracts have been awarded for five experimental planes, 147 service planes and 168 radial engines as a part of the Navy's five year building program, it has just been announced by the Bureau of Aeronautics, Navy Department. The planes and engines contracted for will cost a total of $4,172,949 and will be produced by eight airplane manufacturers and two engine builders

Great Lakes Aircraft Corporation received a contract for eighteen TG-1's These are the torpedo and bombing type evolved from the Martin T4 M-1, about 100 of which have been placed in service The Curtiss Aeroplane & Motor Company, Inc will build 36 F8C 4's which are two-seater fighters powered by radial engines The Consolidated Aircraft Corporation will build 51 NY-1's, the Navy's standard training planes and the Chance Vought Corporation will build 42 02U 4's which is the latest development on the two-seater Corsair A contract for 32 Cyclone engines was awarded the Wright Aeronautical Corporation as was one to the Pratt & Whitney Aircraft Corporation for 36 Hornets

Of the five experimental planes, two are to be made by the Glenn L Martin Company, of Baltimore, Md One hundred and fifty thousand dollars has been granted this concern for the building of an all-metal monoplane flying boat designed for patrol work and to be powered with three Pratt & Whitney Hornets This will be the highest powered flying boat ever built in this country. The Martin company will also produce a high-speed experimental torpedo plane for carrier use.

The other three experimental planes are an all-metal transport monoplane and two 2-seater observation planes of the convertible type Berliner-Joyce Aircraft Corporation Baltimore will produce one of the observation planes, while Keystone Aircraft Corporation Bristol, Pa., is to build the other. The contract for the transport has been awarded to The Stout Metal Airplane Company, Division of Ford Motor Company It is to be powered with three "Wasp" engines and is to carry 12 persons, a crew of two and 10 passengers

Watkins Starts Production

WICHITA (KAN.)—The Watkins Aircraft Company, organized here a few weeks ago to manufacture a low-winged monoplane designed by W. C Cummings of Minneapolis has started quantity production The first plane, powered with a 60-hp. engine, performed so satisfactorily, according to officials of the company, that it was to start manufacture immediately while waiting an approved type certificate from the Aeronautics Branch Hollis Bridgeman, general manager, expects production to reach ten planes weekly late in the summer

Brazilian Military Order to N-B

MARSHALL (MO.) — From Forea Publica the Brazilian military forces at Sao Paulo, Brazil, Nicholas-Beazley Airplane Company Inc, this city, has received a large order for engines, parts, tubing and accessories, according to W F Potter, export manager of the local firm. Mr Potter states that considerable activity in the South American field is evidenced

Navy Unit Launches Air Survey of Alaska

WASHINGTON (D C.) — Arrival of the aerial survey unit in Alaska and commencement of operations are reported by the Naval Bureau of Aeronautics After flying tests at Seattle and some weather hazards en route, the four Loening amphibion planes of the detachment arrived in Ketchikan on May 22 followed two days later by the tender *Gannett* towing a barge on which is housed photographic laboratory equipment and technical personnel. Bases and beaching facilities have been established at suitable points and mapping flights now are well under way

Plane radio has been found especially valuable in getting the weather ahead along the line of flight The weather changes so rapidly in Alaska, it is stated, that a report received just before leaving the ground may be of no use a half hour later. Communication has been successfully established between planes and ships as well as the shore stations of the United States and Canadian governments.

Ted Braley Plans Aircraft

WICHITA (KAN.)—Ted Braley, who recently retired as president of the Braley School of Flying, which he founded a few years ago, has purchased an 80-acre tract near the town of Mulvane south of Wichita, and announces plans to establish an airplane factory there He also will operate a flying field on the tract Braley says he will build planes to order. He expects to have the first plane in the air before the end of July

Gets Lockheed for Whale Hunting

DETROIT (MICH.)—Comdr Fin Lutzow-Holm, chief test pilot of the Royal Norwegian Navy, recently took delivery here on a Lockheed Vega monoplane, Wright J-6 powered, in which he plans aerial survey and observation work for a fleet of Norwegian whaling vessels in the Antarctic next winter

K-R Opens New Plant

HAGERSTOWN (MD.) — The Kreider-Reisner Aircraft Corporation of this city has moved into its new large factory and it is expected that a daily production of four machines will be realized soon

Kinner and N-B Firm Branches Announced

NEW YORK (N. Y.)—Announcements have been received here of the establishment of branch stations, one by the Nicholas-Beazley Airplane Company, Marshall Mo., and the other by the Kinner Airplane and Motor Company, of Glendale, Calif The Nicholas-Beazley branch will be at Los Angeles, while the Kinner sales and service depot is to be established at Omaha, Neb.

Nicholas-Beazley's new western base to carry a complete stock of parts and supplies amounting to approximately $250,000, is expected to be in operation by the latter part of this month, with George O Wheeler, of Los Angeles, as branch manager This station is to serve as a base for Far East export operations as well as for the West Coasts of South and Central America. An assembly plant and warehouse for the NB-3 plane is also contemplated

William C Moffat has been sent by the Kinner firm to take charge of the new engine station at Omaha He has established temporary headquarters at 3808 Dodge Street

South Bend Plans August Show

SOUTH BEND (IND.)—Under the directorship of John B Knespert, supervisor of the Municipal Airport and assistant chief of police, a modern transportation show is schedulel at the South Bend airfield Aug 27-31 Planes and automobiles will be on view to the public gratis, and various air events such as refueling tests, air races, an OX-5 endurance contest, etc, are on the tentative program A further attraction will be the stop at the local port on Aug. 28 of planes competing in one of the national air race derbies

Curtiss Has Lighting Division

NEW YORK (N. Y.)—An aeronautical lighting department has been created by the Curtiss Flying Service, according to C S Jones, president It will be headed by L C Simpson, a graduate electrical engineer of the University of Colorado, who has been engaged in aviation lighting problems for several years, recently having been in airport lighting work for the Westinghouse Electric & Manufacturing Company The new department will sell a full line of lighting equipment for airports, airways and aircraft

Rohrbach Seeks to Sell Rights

NEW YORK (N. Y.)—Dr A K Rohrbach, well-known German aircraft designer is in this city participating in negotiations for the sale of the American rights to manufacture his products As AVIATION goes to press no probable purchaser has been named. Dr Rohrbach expects to return to Germany within about a week. An option to purchase the rights, held by The Aviation Corporation is said to have lapsed

PERSONNEL

MAJ-GEN JOHN F O'RYAN has been elected president of the American Motorless Aviation Corporation, which will conduct the glider school at South Wellfleet, Cape Cod, Mass., this summer.

JOHN HADIGAN has joined the Wallingford, Conn, Air Transport, Inc, as pilot

HUGH PIERSON has been appointed Minneapolis traffic representative for Yellow Cab Airways, Inc

CURTIS W. YOUNG has been made sales manager for the Rochester, Minn, unit of Universal Aviation Schools

EDMUND FISCHER, formerly of Old Colony Airways, Revere, Mass., is now airport manager for the Springfield Airport Springfield, Mass

EDWARD BUTTS JR. has been appointed sales manager of the Whittelsey Manufacturing Co, Bridgeport, Conn.

C M. SMITH is in charge of the Aeronautic Branch airways communication station near Lambert-St Louis Field. Others on duty there are Assistant Traffic Supervisor P E White and Operators Pearlman and Tierney

PAUL AHLERS has been appointed chief inspector for the Curtiss-Robertson Airplane Manufacturing Co

"RED" HARRIGAN, formerly of Sky View Airplanes, St Louis, has been put in charge of factory sales demonstrations of the Mahoney-Ryan Aircraft Corp

"TED" BOOTH has been appointed publicity manager for the Curtiss Flying Service of St Louis

NORMAN ANDERSON has been appointed to the Parks Air College ground school staff

NORMAN F HERTZER has joined the staff of commercial operators in the lighter-than-air division of Goodyear Zeppln Corporation, Akron

DON DIEGEL, formerly with the Eagle-rock Aircraft Corporation, Colorado Springs, has become pilot-instructor for the Garland-Clevenger flying school Amarillo, Tex., and TIP SCHIER formerly chief instructor of the school, is returning to the Halliburton lines

CAPT. L. C DEVANEY has resigned as superintendent of operations for the West Coast Air Transport

W C VAIL now is supervisor of dealers of the Swallow Airplane Company

J M MOELLENDICK has become associated with the Sullivan Aircraft Corporation, Wichita

JAMES LEWIS has joined the staff of the Von Hoffmann Aircraft School, St. Louis

HAROLD FOSTER has become field manager for Western Air Express at Amarillo, Tex

MERVIN P. BICKLEY, formerly traveling passenger agent for Southwest Air Fast Express, has been appointed St. Louis district traffic representative of the company, succeeding M V Little.

ALEX SWANSON has been appointed pilot for the Universal Aviation Corp

MAJ R L. COPSEY, formerly with the Aeronautics Branch, has been made general manager of the Newark, N J., Air Service

FRED H JUNK, formerly with the Floyd J Logan Aviation Company, Cleveland, Ohio, has been appointed engineering officer at Lowry field, Denver

COMMANDER F K GUNDLACH, has resigned from the board of directors of Coastal Airways, Inc

VIRGIL D STONE has been named pilot of the Empire company, Bartlesville, Okla

E. A WATKINS of Wichita Kan., formerly head of the Central Air Lines, has been made an executive of Branlff Airlines

BERT MEYEN of Omaha, Neb., has been ordered to Selfridge Field, Mich., for duty with the First Pursuit Group.

Representatives Named

EAGLEROCK—Lakeside Flying Service, Erie Pa., for northwestern Pennsylvania

The Simmons Aircraft Division of Steel Inc, Los Angeles, Calif., in part of the export field

DETROIT AIRCRAFT—Austin F Bement, Inc., Detroit and Chicago advertising agency

STINSON — Duncan A McIntyre, Tulsa Okla., for the state of Akansas

RYAN—Wedel-Williams Air Service, New Orleans, La.

GREAT LAKES—Far Nutter, Minneapolis, for the state of Minnesota.

AVIAN—R F Raymond, Jr. and G Bruce Stuart of Boston, Mass., for the Boston district.

AERONAUTICAL CALENDAR

July 16-27	International Aircraft Exhibition at the Society of British Aircraft Constructors Olympia London
Aug 24-Sept 2	National Air Races and Aeronautical Show Cleveland Ohio
Aug 26-28	Society of Automotive Engineers, Cleveland Aeronautic Meeting
Sept 2-7	Class C Aviation Exhibit Rochester Exposition at Rochester N Y
Sept 6-7	Schneider Cup Race over the Solent Cowes England
Sept 23-28	Fourth Annual New England Aviation Exposition, Boston Garden, Boston Mass.
Sept 28	Gordon Bennett Balloon Trophy Race St Louis, Mo
Oct 5-21	National Air Tour Starting from Ford Airport Dearborn Mich
Oct. 12-27	Southwestern Aircraft Exposition, State Fair Grounds, Dallas Tex
Oct. 31	Guggenheim Safe Aircraft Competition closes
Nov 18	Lehigh Airport Design Competition closes Lehigh Portland Cement Company
Dec 1-9	International Aeronautical Exposition of the Aeronautical Chamber of Commerce, Chicago

TRADE TIPS

It has been reported that

A modern airport equipped with beacons and field lights is to be built at Mount Morris, N Y, by a group headed by Henry Kingston

Clifford Ball, operator of the Pittsburgh-Cleveland air mail, is to build a $50 000 hangar at Cleveland airport, 110 x 120 ft including the waiting room, offices, pilot's room and shop

North Platte, Neb is advertising for bids for repairs on the municipal hangar The estimated cost is $3,000

The Whittelsey Manufacturing Company is seeking a St Louis distributor for the Whittelsey Avian, according to announcements in St Louis.

The city manager of Long Beach, Cal., is about to let the contract for construction of a quarters building, service station and hangar at the Long Beach Municipal Airport The hangar will be 122 x 152 ft

Concerning Hawks Fuel Loads

NEW YORK (N. Y.)—In an article written recently by George W Vos, advertising manager of The Texas Company, figures were given to show the careful preparations made by Capt. Hawks for his recent transcontinental record flight According to the article Captain Hawks, a director of the aviation department of the company, carried 550 gal of "Aviation Gasoline" at the take off on each of the transcontinental legs, making a total of 1,100 gal or approximately 20 per cent more than was required for the flight both ways This provided a considerable margin of safety in the event of errors in navigation

Fairchild Adds Plant Space

FARMINGDALE (L. I.)—Three acres of land adjoining the site occupied by the factory of Fairchild Airplane Manufacturing Corporation have been purchased by the Faircam Realty Corporation, a subsidiary of Fairchild Aviation Corporation. The building now standing on the property contains 41,761 sq ft. of floor space, and to it is being added a bay of brick and steel construction measuring 240x70 ft, which will add 16,800 sq ft of space. The entire building will be used to house the design and development division of the Fairchild company, as well as the service department and the pontoon division.

52 Schools Use Rankin Plan

PORTLAND (ORE.) — The Rankin System of Flying has been widely adopted, the company reports. This copyrighted system was developed by Tex Rankin and his assistants at the local Rankin school It has been on the market for less than a year and is now in use in 52 flying schools in the United States

BRIEFLY

It is understood that United Aircraft & Transport is now negotiating to acquire Sikorsky Aviation Corporation

Six Keystone bombers from Langley Field on July 5 used 24 bombs ranging in weight from 100 to 600 lbs., on the Greek steamer *Paraguay* which was stranded off Kitty Hawk, N. C.

Curtiss Flying Service will start its first ground school course in St. Louis July 18 with Roger F. Becker, author of the engine section of the Curtiss manual, as chief instructor

Demand for its milling machines by aircraft engine manufacturers has caused the Kearney & Trecker Company, Milwaukee, Wis., to buy the Gerlinger Electric Steel Foundry to provide increased manufacturing space. Pratt & Whitney, Wright, Curtiss and Fairchild use these machines.

Clarence Chamberlin is reported trying to establish an aircraft factory and flying school somewhere in the middle west.

Braley School of Flying, Wichita, reports a class of nine women has enrolled to take the ground and flying course.

Licenses to manufacture Fokker planes have been bought by Denmark, Norway, Sweden, Poland and Italy, while private concerns have acquired licenses in the British Empire, Hungary, Czechoslovakia and Belgium.

Warnings are being issued in Florida against spurious aeronautical promotion schemes said to be flooding the state

The Miami Aircraft Corporation has received an order for the first of its Miami Maid flying boats from the Curtiss Air Station, Inc., Atlantic City, N. J.

Consolidated Instrument Company of America, Inc., reports June sales at the annual rate of $845,000 with unfilled orders as of June 30 in excess of $500,000 of which government contracts total $220,000

The field manager of the Oklahoma City Airport is keeping a card index record of progress of each student pilot and both Universal and Curtiss school have endorsed the arrangement. Students not showing aptitude are immediately dropped from the schools.

It is expected that a committee representing the United States Navy board will visit Medford, Ore., late this month to consider a site for the Navy dirigible base.

Kirkman Aeroplane & Motor Company, Inc., of 31 Nassau St., New York, N. Y., has filed a certificate in the office of the secretary of state changing its corporate name to Kirmo Corporation

The new tri-engined Boeing transports are considered by the builder to be easily adaptable as flying post offices, should such be introduced in the air mail service

Comdr. Osamu Sugimoto, aviation engineer of the Imperial Japanese Navy, is now making an study of manufacturing methods at the Airplane Manufacturing Corporation plant at Farmingdale, L. I.

The Chance Vought Corporation reports a company record of $1,113,500 for net sales in the first five months of this year. More than 700 are now employed in the Vought factory

A folding undercarriage has been invented by Thomas Reilly of Fonda, Ia., and a patent has been issued it is reported.

Four Curtiss Robin planes have been sold by Delmar Snyder, Minneapolis sales agent for Universal.

Mason City, Ia., has been included on the route of Yellow Cab Airways, Inc., on the Twin Cities Des Moines-Kansas City line

Clarence Chamberlin was said to have indicated at Minneapolis, Minn., that he will attempt a second trans-Atlantic flight this fall in a flying boat now being built in New Jersey by the Bellanca company

Production of Moth planes at Lowell, Mass., plant has reached four machines a week

The Zaharoff Aircraft Corporation of America, New York City, reports that it will start construction this month on its first amphibian

A fourteen place double hulled Savoia-Marchetti S-55 flying boat has arrived at New York City for the American Aeronautical Corporation and will be used by the Airvia Transport Company at its New York-Boston run due to be started July 15

Universal reports that up to May 31 planes of the company and subsidiaries had flown 2,880,000 mi. without a serious accident

W. T. Ponder, Texas and Oklahoma representative of the Ryan Aircraft Corporation St. Louis, is said to have sold $92,750 worth of planes in individual orders in three months' time

Coastal Airways, Inc., New York City, and Mill Basin Aircraft, Inc., are said to show total assets of $974,726 as of May 31 and current assets of $22,503

A special course in mechanics and aircraft welding to develop highly trained mechanics for the Air Corps has been started at Rantoul Field, Ill.

Public Service Electric & Gas Company will place airport markers on top of gas holders in the New Jersey territory of the company.

Six orders totalling over $100,000 has been received recently by the Consolidated Instrument Company of America, it is reported

A Lockheed executive has been delivered to William G. McAdoo. The machine contains complete office equipment

The Southern Air Transport, Inc., flying school has been established at Amarillo, Tex.

Braniff Airlines is placing signs announcing destination of the machine on planes waiting to take off

New Firms Announced

VANOS AIRCRAFT CORPORATION, Wichita, Kansas, by George Bassett of the Swallow Airplane Company, George Stefkin and C. A. McCorkle of Wichita, W. G. Sandford, of Augusta, O. J. Connell, of El Dorado, and Ernest L. Strong, of Oklahoma City, to manufacture an airplane engine invented by Frank Gough of Oklahoma City, the manufacturing rights of which are held by H. B. Bisbee of that city

PACKARD AIRCRAFT COMPANY, Enid, Okla., by George Arbenez, Capt. Hugh Askew, John Parker, Jr., John Carr and John Zacharias, all of Enid, to manufacture a training plane and light tri-engined transports

JIM'S TRANSFER COMPANY, Enunclaw, Wash.; capital $50,000; by James E. Barnes and S. R. Barnes; to engage in the motor and air transportation business

JEFFERSON AIR LINES, Jefferson City, Mo., capital $100,000; by Capt. William Wimer, A. S. Knapp, Theodore Oberman, W. E. Gundelfinger, Theodore Herkert, Vincent Ring and Richard Hawes, Jr., to operate a flying school and conduct an aerial sightseeing business

LOCKPORT FLYING SERVICE, INC., Lockport, N. Y., capital 200 shares no par value stock, by Elmer Ace, Louis W. Tobey and Charles Pfeifer, Buffalo N. Y., to deal in and maintain aircraft of all kinds

ARIZONA COLLEGE OF AERONAUTICS Phoenix, Ariz., by W. J. Touhey and Mark B. Thompson

SKYCRAFT SERVICE COMPANY, Butte, Montana, capital $300,000, for general aviation service

BOURBON AVIATION CLUB, Indianapolis, Ind., by Alfred Worsham, Wendell F. Morrical, Lester Kuntz, and Ralph Acker, to promote interest in aviation

THE ELMORE FLYING CORPORATION Orville, Ohio, capital $10,000, by Edward P. Carsten, Merrit W. Doty and Theodore A. James

AIRFOAT ENGINEERING COMPANY, Wichita, Kan., by George Stefkin, Henry Schweiter, W. H. Shuker, Robert E. McMurray and S. W. Cooper, Jr., to specialize in airport development

NEBRASKA FLYING SERVICE, Omaha, Neb., capital $250,000, to conduct transport lines, flying school and other flying services

NEPCO TRI-CITY FLYING SERVICE, INC., Wisconsin Rapids, Wis., by J. E. Alexander, C. A. Jasperson and Isaac P. Witter

OSAGE AIRCRAFT COMPANY, Pawhuska, Okla., capital $25,000, by O. G. Corbin, George Sornickcen and Alan D. Martin, to manufacture a three-place high-wing monoplane

MONARCH AIRCRAFT INDUSTRY, Rockford, Ill., by Dr. Warren M. Miller

AIRPORTS AND AIRWAYS

W.A.E. Provides Fast Air-Rail Service

NEW YORK (N. Y.)—Coincidental with the inauguration of the T.A.T. air-rail system across the continent, the New York Central and the Western Air Express have announced a service which is claimed to make the fastest time between the Coasts. It is possible to reach Los Angeles from here in 45 or 46 hr., according to the officials of both rail and air concerns. This clips two or three hours from the schedule as at present arranged by T.A.T. The New York Central already is co-operating in a 60-hr. service with Universal Aviation Corporation and the Atchison, Topeka & Santa Fe line.

The arrangement involving the Western Air Express calls for departure from the Grand Central Terminal here at 12.20 a.m. on the New York Central's 21-hr. train for Chicago. From here passengers go to Kansas City by either the Santa Fe or the Chicago & Alton where connection is made with the new W.A.E. service to the coast. The flight from Kansas to Los Angeles is made in 12 hr. with stops at Amarillo, Tex., Albuquerque, N. M.; and Holbrook or Kingman, Ariz. Tri-engined Fokkers are used.

It is possible, also, to connect with the W.A.E. planes from this city by way of the Pennsylvania train leaving at 6.15 a.m. arriving at St. Louis at 5 p.m. the second day and at Kansas City at 9 a.m. the next day. The company in addition to this has arranged with practically all the mid-western railroads for air-rail ticket accommodations and passengers make connections with the planes from almost any point.

Tulsa Airport Shows Profit

TULSA (OKLA.)—Final figures for operation of the Tulsa Municipal Airport during April show the city received a net profit of $3,570.91, C. W. Short, manager has announced. Income from pilots' quarters was $328 from concessions $125, and from storage and operations, $4,394.77; total $4,848. Expenses were $1,277. May and June reports, when completed, will show an even greater profit, Short says.

St. Louis-Tulsa Mail Link Asked

WASHINGTON (D. C.)—Among the proposed air mail routes to be considered at the next meeting of the government's Interdepartmental Committee on Civil Airways, will be the suggested link between St. Louis and Tulsa, Okla. The date of the next hearing by the committee has not been set yet although it has been expected that it would be staged the latter part of this month.

Open Wichita Radio Station

WICHITA (KAN.)—The Aeronautics Branch radio station here is in operation. F. H. Stephens, radio electrician who handled installation, said to be in line for promotion, has gone to Portland, Ore., soon to supervise installation of a station there.

T.A.T. Launches 48 Hr. Air-Rail Line

NEW YORK (N. Y.)—Transcontinental air-rail service of the T.A.T. system, which includes the Pennsylvania and Atchison, Topeka & Santa Fe Railroads, was launched here at 7.05 p.m., July 7, when the Pennsylvania's Airway Limited train pulled out of the city with the first group of passengers to use the line on regular conditions. The trip across the country is scheduled by the system to take only 48 hr.

The first eastbound passengers left the Grand Central Air Terminal at Glendale, Calif., July 8 in one of the system's Ford transports. The machine was flown as far as Winslow, Ariz., by Colonel Lindbergh, chairman of the technical committee of the organization, which has built up the extensive ground and air departments along the airway.

[A complete description of the line was published in the July 6 issue of AVIATION.—Editor.]

Link St. Louis And New Orleans

ST. LOUIS (MO.)—Weekly passenger service between New Orleans and St. Louis was inaugurated July 3 by Wedell-Williams Air Service, Inc., affiliated with the new Southern Air Express. Ryan Broughams are used. Beginning Friday, July 12, the following time schedules will be in effect:

Northbound (Every Friday)		Southbound (Every Saturday)
8 a.m. Lv	New Orleans Ar	6 p.m.
12 a.m. Lv	Jackson Lv	2 p.m.
1 p.m. Ar	Memphis Lv	1 p.m.
3 p.m. Lv	Memphis Ar	12 a.m.
6 p.m. Ar	St. Louis Lv	9 a.m.

Rates are: New Orleans and Jacksonville $20; Jackson and Memphis, $30; Memphis and St. Louis $25; continuous passage between New Orleans and St. Louis $50; continuous passage between Jackson and St. Louis, $45.

Embry-Riddle Triples Service

INDIANAPOLIS (IND.) — Three round trips daily between Chicago and Cincinnati by planes of the Embry-Riddle Company were to start July 8, according to Donald A. McConnell, local representative. One round trip will be for mail, one for passengers, and one for both mail and passengers.

Hingsburg Urges Better Air Markings

WASHINGTON, (D. C.) — After a 5,000 mi. airways inspection trip Capt. F. C. Hingsburg, chief engineer of the Airways Division, Aeronautics Branch, has come to the conclusion that the outstanding need of the airways system is more adequate marking for day flying. It is particularly important that better marking provisions be made at this time, he believes, because many itinerant and sport fliers will make their first trips over the airways this summer and will find difficulty in finding airports and landing fields under the present system.

A circle is recognized by the pilot as the standard marker of a landing field and as an invitation to land. Captain Hingsburg believes, however, that the whitewashed circle marker used at most airports is more indistinct than it should be because it blends with other neutral colors. To increase visibility, he recommends that a chrome yellow be used on circles from one hundred to two hundred feet in diameter. These circles would have a rim of 5 ft. composed of gravel or crushed stone which would be sprayed with the yellow paint. Where runways or landing strips are used, runway indicators would be installed in conjunction with the circle and would be 5 ft. wide and 100 ft. long.

Indistinct Boundaries

Another difficulty is experienced in landing at an airport for the first time, Captain Hingsburg reports, because of the inability of the pilot to determine the boundary lines. Many accidents occur by over-shooting or landing on an area which, from the air, appears to be part of the landing strips. To designate landing fields properly he recommends corner and border markers 3 ft. wide and 100 ft. long. These strips outlining the field should be painted chrome yellow also, he believes.

As to unsafe areas on landing fields, it is urged that the marking system be made more adequate by the installation of temporary lighting circuits. Day markers of wooden planks fastened to a light framework, are recommended also. During the inspection trip it was noticed that the majority of towns along the airways have not been air marked. In this connection, it is pointed out that for the best interests of flying it is important that all towns be air marked with the standard roof marking covered in the Commerce Department's bulletin.

The Airways Division has taken steps already to mark all intermediate fields with chrome yellow circle markers and to install runway indicators and border markers.

Report Additional Airport Construction

Development Work Continues in Many Places

A cement runway 1,000 ft long and 150 ft wide has been completed at the new Detroit Municipal Airport and contracts are said to have been let for 20,415 sq yd of concrete surface to be used as hangar aprons, taxiways and maneuvering space for machines taking on or discharging cargo

An airport at Lake Placid, N Y, is to be developed by Aviation Consolidated, Inc, which has taken over 190 acres and already is running sightseeing flights Construction of the Army's Randolph Field at San Antonio is well underway The project will cost several millions of dollars, will occupy several square miles in area and capable of housing several thousand persons

William J. Murray Construction Company, Albany, N Y, has been awarded a contract for building the additions to the maintenance building at the Albany Airport to house the weather bureau Cost will be $7,544

Complete Braley Dormitory

A three-story dormitory of brick and steel has been completed by the Braley School of Flying at the Braley airport of 320 acres southeast of Wichita The dining hall and kitchen are located in the basement Library and recreational facilities are on the two upper floors which have twenty rooms, each providing accommodations for four students

Cocoa, Fla, has leased 80 acres for a municipal airport. A second hangar is under construction at Holmes Airport, Jackson Heights, L I, by the Gates Flying Service Inc It is stated that complete installation of lighting and drainage systems at Omaha, Neb, will be completed this month

A five months' option to buy 115 acres of Welch field, Anderson, Ind., at $250 an acre for development of a municipal airport has been signed by the board of works The Orin Welch Aircraft Company will retain 20 acres for its factory buildings T.A.T. has installed at B B T floodlight and boundary and obstacle lights at the Mars Hill Airport, Indianapolis

May Reconsider Mills Field Vote

Re submission of the $2,000,000 Mills Field bond issue to the voters at the November election is under consideration This amount is said to be needed to keep the San Francisco airport in a modern condition The 2 000 gal electric gasoline pump manufactured by the S F Bowser & Company Fort Wayne, Ind, has been installed at the Capitol Airport, Indianapolis The Marion Ind Airport Corporation has installed flood lights at its airport

Corporate bonds totaling $20 000 have been authorized by the Davenport Ia city council for the construction of hangar and installation of boundary, flood and beacon lights It is expected that 25 additional acres will be added to the field which now is under lease to the Iowa-Illinois Airways Company,

Contract has been awarded the Union Oil Company of California for the immediate erection of a combination aviation and automobile service station at the Los Angeles Metropolitan Airport Plans for the $50,000 Army Reserve air base to be erected by the City of Long Beach, Calif., at its municipal airport have been approved by the Long Beach City Council Reserve training activities are now being conducted at Clover Field, Santa Monica

To Have Amusement Section

More than $1 000,000 is to be spent at once, on the construction of a hotel, restaurant, park, tennis courts, and other recreational features at the Grand Central Air Terminal, Glendale, Calif, under the plan of the Curtiss interests to make the field a recreational center as well as an air terminal

A new 80x100x18 ft corrugated steel hangar housing fourteen planes is about completed at Texaco Field by Wings, Inc, Shreveport, La Work has been started on two buildings at the Cedar Rapids, Ia., Airport. One 22x28 ft., of Colonial design, will be used for an office and waiting room and the second 26x40 ft., will be used for a machine shop and ground school classrooms They are being built by the aviation committee of the Cedar Rapids Chamber of Commerce

Navy officials are reported to be considering placing a mooring mast at Miami, Fla Construction of the new engine plant for the Pratt & Whitney Company at Hartford, Conn, is to be started in August

The Curtiss 120x160 ft. hangar at Port Columbus, Ohio, is to be ready within about a month Contracts for the construction of the 240-acre Boeing airport at Burbank Calif, representing an investment of about $1 500 000 have been approved Walla Walla Wash, voters have approved a $50,000 bond issue for the new 162-acre airport

Plan Spokane Improvements

Improvement of the Spokane, Wash, Airport by removal of rocks, grading and installation of boundary lights, is to follow recent settlement of a condemnation suit for additional ground

Plans for the big flying school project of the Southern Air Transport at San Antonio, to be known as Grosvenor Field, are being prepared by Kenneth Francine, of New York City, the architect of The Aviation Corporation Runways will average 3,500 ft. in length

Beaumont Tex, has bought a 275-acre tract four miles west of the city for development of an airport The plans include a 100x80 ft hangar, a small terminal and office building with cafe and sleeping quarters

Ocean Plateau Seen As Aid to Seadrome

WASHINGTON (D C.)—The actual experiments next spring with the Armstrong Seadrome on an air service between New York City and Bermuda is expected to be assisted considerably by the existence of a high plateau in the ocean floor at just about the midway point, where the backers of the project had intended to anchor the floating landing field. The plateau has been mapped by a Navy survey based on studies of the ocean floor by Edward R Armstrong, inventor of the seadrome

This plateau will lessen the length of the cable needed to anchor the seadrome These Roebling cables will be 16,500 ft long and 3½ in in diameter at the two ends, tapering slightly in the center section Double-faced mushroom anchors weighing 30,000 lb. each will be used Belmont Steel Company, Chester, Pa, is making the steel for the seadrome and the assembling will be done by the Sun Shipbuilding Company at Cape May, N J.

Bureau Plans Radio Research

WASHINGTON (D C.)—Having concluded fundamental research work on the radio beacon directive system, the Bureau of Standards now announces a program of radio research for 1930 in which it is planned to increase the flexibility of the beacon, thus making practicable a multicourse directive system Research planned involves (a) the directive radiobeacon, (b) aircraft engine ignition shielding, (c) direction finding on aircraft, and (d) fog landing Work on the latter will be divided into two parts: first cooperation with the Guggenheim Fund and the Sperry Development Company, a plan having been submitted and experiment begun by both agencies, and second, independent work on the part of the Bureau of Standards along other lines such as application of low power directive beacons, altimeters, and field localizing devices

Denver Firm Plans Lines

DENVER (COLO.)—Organization of the Silver State Airways, with headquarters here has been announced Passenger lines will be operated from Denver to Kansas City, Salt Lake City Albuquerque, El Paso, Amarillo and Fort Worth, it was stated Twice daily nonstop service will be maintained between Denver and Kansas City, and between Denver and Salt Lake City, according to Jack Teague of Denver, president of the company Teague said that nine Keystone 20-passenger Patricians have been ordered

To Try Air Mail Reply Cards

BOSTON (MASS.)—Experimental use of air mail business reply post cards has been granted by the Post Office Department through the Boston Chamber of Commerce Postage will be $.06 in the case of these towns instead of the usual $.01

Pittsburgh to Have River Amphibion Base

PITTSBURGH (PA.)—This city will have a downtown airport The city has leased 700 ft on the Monongahela River frontage to Pittsburgh Aviation Industries Corporation, here, for an amphibion landing base It will be in operation in a short time, according to George R. Hann, president of the local firm, and vice president of The Aviation Corporation. The lease is for 10 mo and may be renewed each succeeding 10-mo. period

Planes used will be Loening amphibions powered with Wright Cyclones The first plane is expected in a few days. A large pontoon raft will be built from the wharf into the river for passengers boarding or leaving the planes

Initial operations of the company will be taxi trips. Plans are well along toward the establishment of flights to any point A schedule service from Pittsburgh to Washington, over a route surveyed by the company's pilots is contemplated for the near future.

The pilots will be Lieuts E. C Whitehead and H H Mills, both having had much experience in flying amphibions The company will operate the water base in conjunction with its 640 acre airport, not far from this city, and will house the amphibions at the field, for the present.

Rapid Air Lines Forms Subsidiary

OMAHA (NEB.)—Formation of Rapid Aviation, Inc., as a subsidiary of Rapid Air Lines, of Rapid City, S D, is announced here by Walter F. Halley president of the four aviation units controlled by Halley Air Management, Inc

Rapid Aviation has secured a lease with option to buy, on an airport adjoining the southern limits of Council Bluffs The airport will include 160 acres in ultimate development Operations, including an aviation school and taxi service, were begun immediately.

Headquarters of the Rapid group of companies will probably be moved from Rapid City to Sioux Falls S D, or Omaha in September, Mr Halley has indicated. A grand opening and aircraft show was held at the Omaha Council Bluffs airport, July 4-7

W.A.E. Instals Radio-Phone

LOS ANGELES (CALIF.)—According to Herbert Hoover, Jr., chief radio engineer for Western Air Express, a two-way radio phone communication service will be in operation on the various lines of his company by November 1 This is in line with the development in radio which is being undertaken also by such concerns as the Boeing System National Air Transport and Transcontinental Air Transport and others

Improve Varney Communications

SPOKANE (WASH.)—Radio printer telegraph and telephone service will be installed for the Varney Air Lines, which fly the Salt Lake Pasco air mail and passenger route, according to announcements

Weather Reporting System in Operation

WASHINGTON (D C.)—The Weather Bureau of the U S Department of Agriculture inaugurated its extensive weather reporting service along the New York-Chicago-San Francisco-Los Angeles airway early last week, with the result that reports of the weather along the transcontinental route are being broadcast by radio telephone from stations located at Cleveland, Omaha, Salt Lake City and San Francisco every three hours both night and day. The institution of the service was made possible by a Congressional appropriation of $350,000 for the purpose

The four radio broadcasting stations receive telegraphic reports once every three hours from some 60 selected reporting stations located on both sides of the airway and from 100 to 200 mi from the route. By this means, a strip approximately 400 mi in width, extending from coast to coast, is covered The reporting stations are located about 60 mi apart. The reports sent in by these stations are entered on small-area maps, supplementing the nation-wide morning and evening weather maps, and it is from this information that the summarized statements of current and predicted conditions are formed The broadcast is on a wavelength of 900 m, or from 315 to 350 kc

Consider Pacific Airship Line

SAN FRANCISCO (CALIF.)—Negotiations between The Goodyear-Zeppelin Corporation, Akron, O, and The Dollar Steamship Company concerning the inauguration of a trans-Pacific dirigible service are now under way, it has been reported here. No agreement has yet been reached, it is said, although a service from San Francisco to the Hawaiian Islands would probably be the first to be established. It is understood that if such a service, transporting passengers, light freight and mail, were successful, the line might be extended to the Asiatic countries The airships used would probably be very similar to the two craft of 6,500 000 cu ft. capacity now being constructed by the Zeppelin company for the Navy

R. I. Selects State Port Site

PROVIDENCE (R I.)—A tract of land in the Hillsgrove section of Warwick comprising over 350 acres has been selected by the Rhode Island State Airport Commission for a state landing field The site is about 6 mi due south of this city and accessible from three main trunk line highways The tract is valued at $100 000

Extend Air Mail To Chile on July 16

WASHINGTON (D C.)—Air mail service in South America under auspices of Pan American Airways and its affiliated concerns—Pan American-Grace and Peruvian Airways—is to be extended through to Santiago, Chili, on July 16, according to Assistant Postmaster General Glover, This is for the southbound mail, the first northbound mail leaving Santiago under the new schedule on July 21

The regular weekly schedule is as follows:

South			North
Tue a.m. Lv	Cristobal	Ar Fri p.m.	
Tue p.m. Ar	Buenaveatara	Lv Fri a.m.	
Wed a.m. Lv	Buenaventura	Ar Thu p.m.	
Wed p.m. Ar	Guayaquil	Lv Thu a.m.	
Thu a.m. Lv	Guayaquil	Ar Wed p.m.	
Thu. p.m. Ar	Lima	Lv Wed a.m.	
Fri a.m. Lv	Lima	Ar Tue p.m.	
Fri p.m. Ar	Arica	Lv Tue. a.m.	
Sat a.m. Lv	Arica	Ar Mon p.m.	
Sat. p.m. Ar	Chanaral	Lv Mon. a.m.	
Sun a.m. Lv	Chanaral	Ar Sun p.m.	
Sun noon Ar	Santiago	Lv Sun noon	

The rates (postage plus fees for air mail service) per half ounce or fraction, which must be fully prepaid, will be $.45 from Cristobal to Chile; $.70 from Miami to Chile

The first rate applies to articles to be dispatched by sea from the United States to Cristobal and from that place by F A M Route No 9, and will include dispatch by the United States domestic air mail service, when practicable, to the port of dispatch by steamer

Articles prepaid at the last rate will be given dispatch by the United States domestic air mail service, when practicable, or from San Juan to Miami on F. A. M, Route No 6, as well as dispatch from Miami to Cristobal by F A M Route No 5, and thence by F A M Route No 9 to Colombia

Articles prepaid at the foregoing rate should have affixed the blue label "Par Avion—By air mail" (or, until a supply of such labels is available at the post office of mailing, be marked "Par Avion—by air mail") and be marked underneath, "From Miami" or "From Cristobal," as the case may be

Sees Better Ground System

WASHINGTON (D C.)—Increasing efficiency of ground organizations by the operators of air lines impresses F. Trubee Davison Assistant Secretary of War as one of the striking current developments in aviation Americans have shown a special aptitude Secretary Davison points out, in the conduct of transportation enterprises American railroading has been the model for the world This genius is manifesting itself in aviation, he found during his recent tour

Thompson Adds to Mail Service

DETROIT (MICH.)—On July 8 the Thompson Aeronautical Corporation began to carry mail on the 10 a m plane of its translake passenger, mail and express line, according to a recent announcement.

FOREIGN ACTIVITIES

Design Less Costly Sport Plane in England

LONDON (ENGLAND)—There has been considerable agnation in flying circles in this country for a light plane of much lower cost than the prevailing types Recently a design has been produced for a machine expected to fill this demand.

It is known as the Comper "Swift", a one-place, parasol, folding wing monoplane powered with the 40 hp Scorpion 11 engine. While this is still under construction, its performance may be anticipated inasmuch as it represents, to a large extent, refinements on previous models of Comper Aircraft, Ltd, which have been quite successful

This machine is expected to have a top speed in excess of 100 m p h., a cruising speed of about 80-90 m p h and a landing speed of 30-35 m.p h Excellent visibility is provided by placing the cockpit just behind the trailing edge of the wing in such a manner that the pilot may look above and below the wing without effort

The altimeter and air speed indicator are located on the rear spar in the line of vision of the pilot Other instruments are located on the regular board The shock absorbing device is housed within the fuselage Other characteristics are: Span, 24 ft, weight empty, 331 lb., width folded 7 ft 6 in Its cost will be about $2,000

Atcherley Wins Cup Race

LONDON (ENGLAND) — Flight Lieut. R. L. Atcherley won the this year's King's Cup race over a 1,169 mi course around Great Britain in a Gloster Grebe with an average speed of 150 3 m p h Lieut. L G Richardson in a Moth was second and Capt W L. Hope, last year's winner, was third Miss Winnifred Spooner, one of three women competitors, finished fifth Capt T H Stack, who was leading by a narrow margin at the close of the first of the two days required for the event encountered engine trouble and finished sixth

Autogyro Climbs to 12,000 Ft.

LONDON (ENGLAND) — Information recently has been received from Senor Don Juan de la Cierva who has been carrying out experiments with a new type of Autogyro in Madrid that the machine has climbed up to 12,000 ft in official tests The plane in question is fitted with a device for starting the rotor while the machine remains stationary the result of which has been to get the machine off the ground in an extremely limited space and with a very short run

Foreign News Briefs

The Moncton, N B, Municipal Air port was dedicated by an air meet July 1 and 2

A final official report on the cause of the Graf Zeppelin's engine trouble on the recent attempted flight to the United States blames vibration of the shaft system

"Metal fatigue" caused the failure of bolts in the starboard engine of the City of Ottawa, which crashed to the English Channel June 17, according to the board of inquiry

Flying a cabin monoplane, Capt J D Parkinson, of the Curtiss-Reid Flying Services, Ltd., Montreal, Que., recently established a new official Canadian altitude record of 20,000 ft

It has been proposed that the new Toronto, Canada, airport be named for Alcock and Brown, the first flyers to cross the Atlantic in a direct flight.

An elaborate new aerodrome is to be built at Deurne, near Antwerp.

Hawker Horsleys, single-engined bombers, are being built in England for the Greek Government.

Hungary has eight airports, seven owned by the government and one by a private interest

As AVIATION goes to press the Southern Cross has reached Bagdad on its attempt to fly from Australia to England in thirteen days It arrived at Bagdad on the tenth day

Makes Light Plane Distance Record

WINNIPEG (MAN)—D S Zimmerley, of Marshall, Mo, recently set up a new non-stop distance mark for light planes when he flew a Nicholas-Beazley NB-3 from Brownsville, Tex, to this city, a distance of about 1,700 mi, in 16 hr He took off at 2.45 a.m on July 7 and landed at about 6 45 that afternoon The machine weighs 771 lb and carried a load of 871 lb The fuel weight was lessened by employing a mixture of 10 per cent benzine It carried 10 gal of oil

His route from Brownsville was Waco, Tex.; Guthrie, Okla.; York, Neb., Yanktown, S D.; and Caselton, N D The engine was a LeBlond 60 hp The machine is a low-wing monoplane designed by Barling for the Nicholas-Beazley company The stock model has accomodations for three.

Dornier Dox Ready For Tests

GENEVA (SWITZERLAND) — It is reported here that the giant 100 passenger Dornier Dox has been completed and is ready for its flight tests, which will be started soon The machine is the plane developed for trans-ocean flying on the principle of the "flying wing." It is powered with twelve engines enclosed within the wing, which also has accommodations for passengers, The performance of the machine is awaited with considerable interest

Chinese Designers Develop Military Plane

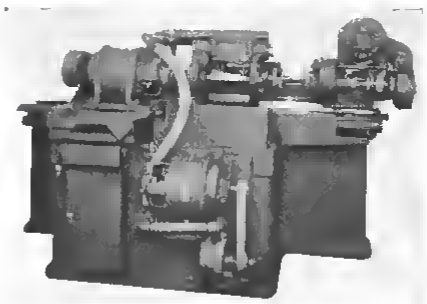
CHINA PRODUCES a military machine. This is a bombing and torpedo plane recently completed It was designed and constructed by the naval air establishment at Foochow, China.

THE BUYER'S LOG BOOK

Norton Cam Grinding Machine

IN ORDER to solve the problem presented in cam grinding for aircraft engines, the Norton Co, Worcester, Mass, has developed a specially arranged grinder which is equipped with a motor driven grinding wheel spindle and a cam grinding attachment for large diameter loose cams This was made necessary because of the fact that radial engine cams are usually much larger than those employed in automobile engines and have contours with several lobes adjacent to which are re-entrant curves of comparatively small radii Two such cams are usually made integral separated by a narrow space and not attached to a shaft or any other part of the engine when ready for grinding The company also manufactures grinding machines for other purposes

In the Norton machine the cam grinding attachment is driven from a special headstock having an extra speed reduction to obtain the slow speeds of revolution necessary in grinding this type of cam Three motors are



A rear view of the Norton Grinding Machine for aircraft engine cams

employed for driving the pump, the wheel spindle and the headstock

Grinding of this type of cam with small wheels is a much slower operation than the grinding of automobile cams since the surface to be ground is several times greater and the smaller radius of the re-entrant curves requires slower revolution in order that the roller may follow the master cam and the grinding wheel have time to cut. It is also impossible for a very small grinding wheel to remove metal as rapidly as a large wheel Wear of the grinding wheel is always an important factor in cam grinding as a small reduction in the size of the wheel will affect the shape of the contour. When using very small wheels on large cams the wheel wears rapidly and for very accurate work the final finish grinding must be accomplished with a new wheel Radial engine cams have re-entrant curves of such small radii that grinding wheels less than 1½ in. diameter may sometimes be necessary to finish the contour

"Portalite"

A HIGH-POWERED portable electric emergency light which could be used to advantage at many airports, is offered by the Portalite Company, 1109 Massachusetts Avenue, Cambridge, Mass The "Portalite" consists of a lighting unit for which current is furnished by a self-contained storage battery of high capacity providing a long operating life When discharged the battery can be instantly and easily substituted by a fully charged one A specially shaped reflector and a special bulb combine to provide a high degree of brilliancy and range. The weight of the unit complete is 13 lb.

The "Portalite"

The Portalite can be furnished in either the beam or flood type According to the manufacturer the beam type Portalite will project a 300,000 cp beam on objects up to one and one quarter miles away depending on conditions, and the flood type Portalite will brilliantly illuminate 30,000 sq ft at a distance of 50 ft, this area being equal to that of a circular area with a diameter of about 200 ft

The battery furnished is a special non-spillable type, having a capacity of 15 ampere hours It is designed to produce a high capacity with a low weight Spare batteries can be furnished to replace discharge batteries.

A Portalite projector unit embodies the use of an 8 in. brass single-shell reflector silvered over nickel and designed to throw a powerful ray The bracket is machined from brass composition castings and then nickeled. It is so designed to remain set with the light pointing in any direction.

This device operates continuously for two and one-half hours or a total of about three and one-half hours in intermittent service A smaller bulb giving half as much light will double the burning hours

The projector is available without the battery and when sold in this manner is known as the "Beamolite" It is furnished complete with clamps for attachment

Nacto Airport Building Tile

NATCO double shell face tile for all types of aviation buildings is now being offered by the National Fire Proofing Company, Fulton Building, Pittsburgh, Pa This tile is manufactured in 5x12 in. face for 6 or 8 in. wall.

Natco tile is made in large units (equivalent to six bricks) of hard burned clay and is light and easily handled and laid The glazed surfaces are permanent sanitary and easily cleaned Air spaces and the double shell feature eliminate through mortar joints, resisting the passage of cold heat, and dampness

SIDE SLIPS

By
Robert R Osborn

We see that one of the papers to be presented at the national convention of the National Association of Real Estate Boards is "New Uses for Real Estate as the Result of the Development of Aviation." This seems to us to be a very interesting subject and should arouse a lot of discussion. For instance, we'd like to mention the possibility of a large fortune for the live-wire real estate agent who could make a specialty of quick service in answering inquiries, such as the following coming in over his radio:

RENT Aviator about to have forced landing wishes to rent short lease, level, smooth field about three thousand feet long, with wind blowing long way of field. Location near good road, garage, railroad station desirable but not essential. Willing to interview agent on premises. Quick reply appreciated. Reply Airplane, Z-77772.

* * *

Also, while we are on the subject of real estate, we are reminded that the Intrepid Aviator dropped in a while ago with a suggestion for Mr. Hoover in connection with his farm relief problems. He thinks that the farmers should be encouraged to grow

more potatoes and light garden truck, and not so much corn, wheat, oats and rye, as the latter crops make it very difficult for him to get around in his Jenny during the late summer months.

* * *

The prize for this week has been awarded unanimously to the typesetter on the New York paper who substituted "skyscrapers" in an article describing some of Commander Byrd's ships which were "flying up and down Antartic skyscapes."

* * *

This item seems to have wandered into our mail somehow, with no indication as to who the donor might be.

Charles A. Levine, millionaire airplane manufacturer, accompanied by John Eisman, stopped at the East Boston airport today, on the way from Camden, Me., to New York. The stop was for the purpose of refueling, which was accomplished in half an hour. A rather bad take-off caused a fear that the machine would crash, but Levine was successful in getting it into the air. Two abandoned automobiles carrying a total of 217 bottles of ale were seized."

Apparently the crowd at the field needed a few bracers after witnessing the bad take-off.

* * *

Item sent in by A.G.P. from the Havana *Post*, Havana, Cuba:

"Attacked by three stray dogs, Hugnio Rodriguez Noval, 16, residing in the Reparto Los Angeles, Marianao, was taken yesterday afternoon for treatment to the emergency hospital of Marianao. The attack on the youth occurred at the corner of Campa and San Celestino Streets, the animals being driven from their victim before they had inflicted serious injury. At the hospital it was found that Noval was in no danger of flying as a result of his wounds."

We resent this implication that flying and "going to the dogs" are so closely associated.

* * *

The airplane industry has gotten into production in so many different types and large quantities of airplanes with such inexperienced designers and builders, we have been wondering for a long time just how soon someone was going to make a serious mistake. Considering all of these conditions things seem to have been going along fairly well up to now, but according to the clipping sent in by Mr. J.E.P. of Brackney, Pa., some designer seems to have become rather badly befuddled on a new ship just brought out,—

"The craft, arranged for full dual control * * * is a biplane powered with a 301 horsepower Wright Whirlwind. The wings are fabric, covered with wood spars."

* * *

The newspapers state that a group of Federal soldiers in Mexico were bombed by mistake by one of their own aviators recently. According to the account we read, the aviator was supposed to explore a certain region and bomb any suspicious looking soldiers. Judging by the pictures we've been seeing in the Sunday rotogravure sections for some time the pilot would be justified in bombing anybody in sight if he were sent out with that order.

* * *

Mr. R.A.S. of New York sends in a clipping from the New York *Times* with the comment,—"This chap was lucky. I've been in this situation too but I have always found when my motor stopped that I had about twenty perpendicular feet to fly."

The clipping stated, "F—— was taxiing at an altitude of 300 ft. when the motor stopped. He tried to land in a field and had only twenty horizontal feet to glide."

* * *

Apparently while reflecting on the new invention whereby the pilot can drop his passengers through the floor by pulling a lever, B. H. of New

York points out that the following provision in the advertising folder of a well known air line is significant:

"Pilot may remove passengers from plane at any point on the route for safety or other cause, in which event passenger's sole recourse shall be the recovery of the proportion of the fare paid as distance traveled bears to the schedule of flight."

In the interests of economy, we can imagine the Scotch passengers slipping their 'chutes so as to land as far back along the route as possible.

In the air, as on the road, *durable beauty* takes precedence

PLANES today must meet the same keen competition in styling that governs modern motor car construction. The growth of passenger air-transportation and the widespread use of private planes have thrown a new importance on luxurious appointments that retain their beauty.

To manufacturers of aeroplanes, du Pont now offers a complete line of aircraft finishes that were scientifically developed for present-day needs. Beautiful in texture, ultra-modern in tone and color, and durable to a new degree—they bring you significant advantages in competitive selling.

You can base your whole finishing schedule on these air-tested materials. Wing Dopes, Aircraft Enamels, Dope-proof paints, Army and Navy finishing materials and all other du Pont aircraft finishes have been proved under the most severe flight conditions.

And du Pont color experts will gladly co-operate with you in planning up-to-the-minute color schemes. The du Pont Color Advisory Service is in constant touch with aircraft styling in both America and Europe. Feel free to call on them for any advice or assistance.

Complete information on any du Pont product for airplane use will be furnished either by mail or by a qualified representative.

AIR-TESTED FINISHES

Du Pont Dopes—The du Pont line of aircraft finishing materials includes clear, semi-pigmented and pigmented dopes. They are all tested formulas of remarkable durability—proven in service as well as in the laboratory. Flexible and highly blush resistant, the Army and the Navy have approved these products for their requirements. Available in a wide variety of highly visible colors.

Du Pont Paints and Varnishes—Du Pont chemists have developed a complete line of paints and varnishes including Dopeproof Paint, Spar Varnishes, Fuselage Varnish and Aircraft Enamels.

DU PONT
REG. U. S. PAT. OFF.

E. I. DU PONT DE NEMOURS & CO., Inc.

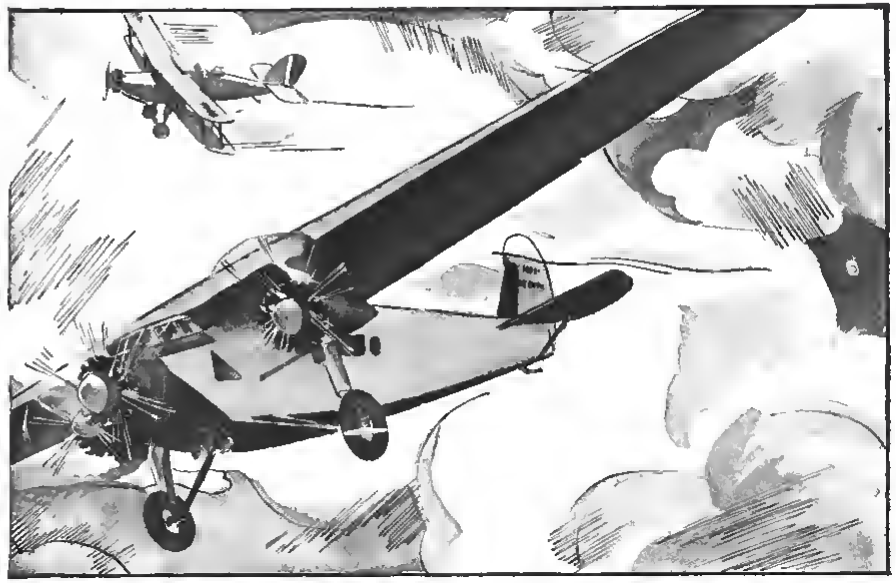
Industrial Finishes Division, Parlin, N. J.

2100 Elston Ave., Chicago, Ill. 351 California St., San Francisco, Cal.

Flint Paint and Varnish Limited, Toronto, Ontario, Canada

MEMBER OF AERONAUTICAL CHAMBER OF COMMERCE

THANK YOU *for mentioning* AVIATION



THE most casual investigation of the planes now on the market shows the growing trend towards luxury in every detail of cockpit and cabin. Generous windows, smart accessories, rich upholstery—color, life and comfort throughout.

In the design of distinctive refinements such as these, du Pont Pyralin and Fabrikoid offer unique possibilities. Extremely light, ideally durable and beautiful in the most modern sense, these materials are supremely fitted for air service.

Pyralin in various colors and effects provides 100% transparent cabin windows, instrument boards and wing lights of smart appearance and utmost serviceability. Its unusual characteristics offer amazing opportunities for other original applications. Complete information on Pyralin and its many present uses will be furnished on request.

Fabrikoid brings aeroplane upholstery up-to-date. Its lightness and toughness unmistakably distinguish it as a material destined for air service. And the designs of the new Nemoursa Aetoplane Fabrics express vividly the buoyancy and gaiety of this most modern mode of travel.

Du Pont technical men are ready to co-operate wholeheartedly in original styling with these materials. Please write direct to the division concerned.

AIR-TESTED MATERIALS

Du Pont Fabrikoid—Sturdy Fabrikoid is an ideal material for open cockpit upholstery. Will withstand varying weather conditions.

Nemoursa Aeroplane Fabrics are new type, light weight materials developed for interiortrims of cabin ships. Made on a high-grade woven cotton base and treated with appropriate pyroxylin colors. Embossed in distinctive patterns.

Du Pont Pyralin—A strong, durable, light, unbreakable, transparent material furnished in any gauge from 5-1000 upward in sheets approximately 20 in. x 50 in. Ideal for windshields, cabin windows, running lights and other uses.

DU PONT
REG. U. S. PAT. OFF.

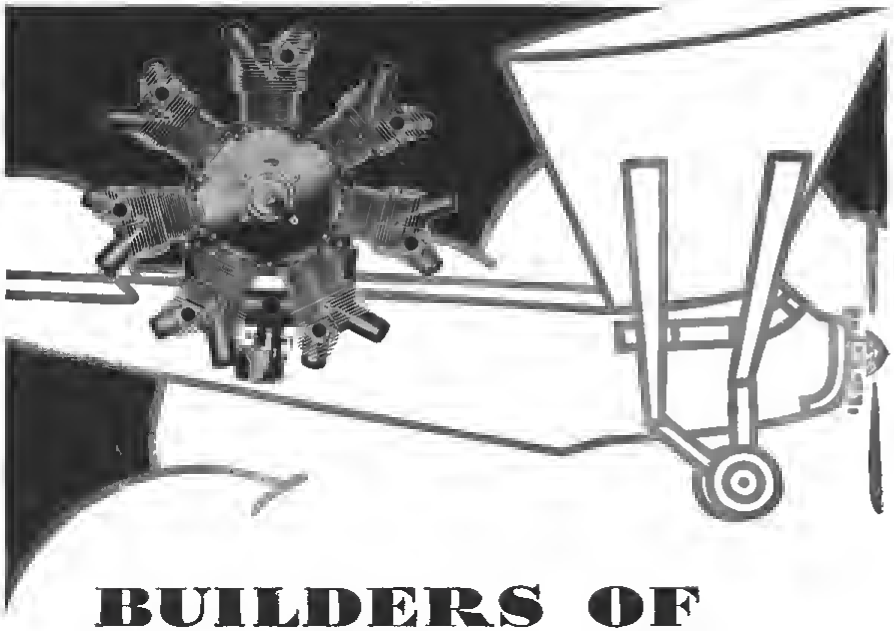
E. I. DU PONT DE NEMOURS & CO., Inc.

FABRIKOID DIVISION Newburgh, New York

DU PONT VISCOLOID CO., Inc

330 Fifth Avenue, New York City

THANK YOU *for mentioning* AVIATION



BUILDERS OF CONFIDENCE

THERE is an integral part of every Continental Red Seal Aircraft engine which cannot be seen or handled. It is that intangible something called confidence. Confidence of the aviator who rides the skies through the air's uncharted ways. Confidence of the manufacturer who installs these engines in his planes.

As the world's foremost authority on gasoline engines as well as its largest producer, Continental Motors Corporation has earned the enviable position in the aircraft industry which only 28 years of specialized experience, knowledge and resources can bring.

See our exhibit booth 50 and 51 at the National Aeronautical Exposition at Cleveland, Ohio — August 24th to September 2nd.

CONTINENTAL MOTORS CORPORATION
AERONAUTICAL DIVISION
Office and Factory: Detroit, Mich., U. S. A.

Continental Engines

EQUIPPED TO SUPPLY EVERY NEED OF THE AERONAUTICAL INDUSTRY

Quickly Reliably Economically

THE Universal Aviation Corporation has a reputation for doing big things in a big way. In establishing a central supply depot for the nation's aeronautical industry, no exception is made.

The Robertson Division of the Universal Aviation Corporation represents an investment of many hundreds of thousands of dollars. Here in St. Louis will be found what is probably the largest, most complete stock of airplane parts and supplies in the United States.

All airplane parts and supplies conform to A-N specifications or accepted commercial standards. Every item is guaranteed to be exactly as described and to give satisfaction in every respect.

Because of the central location at the crossroads of the nation's transportation system, supplies can be shipped to any part of the country in the shortest possible time. When speed means much in securing supplies, depend upon the Universal Aviation Corporation for service.

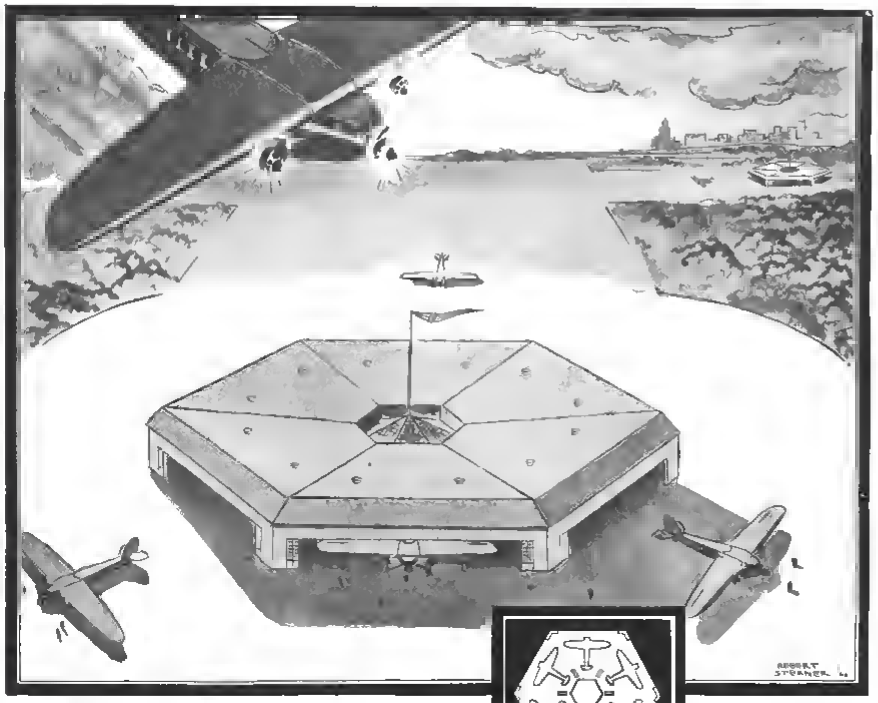
Helmets
Goggles
Aircraft Instruments
Navigation Lights
Magnetos
Propellers
Flying Suits
Parachutes
Spinner Caps
Wheel Discs
Airplane Wheels
Airplane Dope
Bolts
Nuts
Tubing
Cable
Sheet Aluminum
Pyralin Sheeting
Wright Motors and Motor Parts
OX-5 and Hisso Motors and Motor Parts
Authorized Wright Parts Dealer
Official Wright Whirlwind Maintenance and Repair Depot

The entire resources of the Universal Aviation Corporation are behind the Robertson Division, furnishing a tremendous purchasing power. In most cases, supplies can be purchased here by the airplane manufacturer, transport operator or the individual at prices far less than can be obtained elsewhere.

When you need quick service, get in touch with Universal. When purchasing parts and supplies that must meet government inspection, depend on Universal. And if price is an item to be considered, save money by dealing with Universal.

A catalog covering thousands of items carried in stock will be sent upon request. Write today for your copy.

UNIVERSAL
ALL AERONAUTICAL SUPPLIES
AVIATION CORPORATION
ROBERTSON DIVISION
LAMBERT-ST. LOUIS AIRPORT, ANGLUM, MISSOURI



HEXHANGAR
PATS. APPLIED FOR

HEXHANGAR
adopted by Western Air Express

The Western Air Express, one of the world's largest air transport lines, has adopted Hexhangars because of the greater efficiency offered in the handling, storage, servicing and repairing of their transport liners and because of the increased protection against fire hazards made possible by this patented design that has revolutionized hangar construction. ¶ Hexhangars are six sided all metal fireproof units with doors in each of the six sides permitting the entrance or exit of each plane without disturbing other planes within the hangar. ¶ Hexhangars are the most economical form of service hangars for transport companies who desire maximum safety from the ever present fire hazard and the greatest possible efficiency in the handling of planes on the ground. ¶ We shall be glad to furnish established companies an analysis of their airport problems, and full information regarding Hexhangars.

THE WILLIAM EAVES COMPANY
1524 LABAIG STREET, LOS ANGELES, CALIFORNIA

On May 28, this same engine carried Miss Marvel Crossan to a new high altitude for women —over 24,000 feet

RYAN AND WHIRLWIND 9
The last word in power—a perfected installation

A supreme engine installed as only Ryan could do the job—one more reason why so many seasoned flyers and air-line operators prefer the Ryan ship

The 300 horsepower Whirlwind is scientifically engineered into the new model Brougham and, by virtue of correct installation, a great engine becomes a better one.

Look at that exclusive oil cooler design pioneered by Ryan. It forces a cooling draft of air through the opening on one side of the cowl and ejects it on the other side—an added safeguard against overheating of oil.

Every propeller balanced with precision, on quadruple sets of ball bearings —statically and dynamically—so that a breath or bit of paper hung on one end will turn it.

From such things, come Ryan smoothness, certainty and surplus power. Power, intensified by low weight. With Ryan's gross of 4,000 pounds, compare that of other ships of its type, weights running as high as 30 per cent more

The answer is performance. You can cruise, if you wish, at a thrifty rate which conserves your engine. You know there is always unequaled power and speed in reserve.

Is it any wonder that Ryan performance records continue to set the pace for cabin ships? If you'd like to know just what this means in take-off, climbing, altitude and landing, any Ryan distributor will gladly demonstrate

Write for new illustrated catalog. The Mahoney-Ryan Aircraft Corporation, Lambert-St. Louis Airport, Anglum, St. Louis County, Missouri.

Take off with load	8 seconds, 275 ft
Climb, 1200 ft. per min.	
Top Speed, 140 m. p. h.	
Cruising Speed	120 m. p. h.
Service Ceiling	18,000 ft
Absolute Ceiling (light)	25,000 ft.
Landing Speed	50 m. p. h.
(Lands within a 200-ft. circle)	

Department of Commerce Approved Type Certificate No. 142

The New Model **Brougham For Six**

RYAN

SISTER SHIP OF THE "SPIRIT OF ST. LOUIS"

ALL WINGS TOWARD CLEVELAND

1929 NATIONAL AIR RACES
AND AERONAUTICAL EXPOSITION

CLEVELAND—in furnishing the setting will be host to the 1929 National Air Races and Aeronautical Exposition August 24th to September 2nd.

This colorful classic—the most significant in aviation's greatest year—will present the most complete panorama of the latest aeronautical products and represent the greatest assemblage of the industry's executive, engineering and flying personnel.

It will take its place as the most outstanding event contributing to the advancement of aviation, fully depicting the industry's physical accomplishments. Being national and international in scope, it will offer features distinctively new, entertaining and instructive.

For further details communicate with

CLEVELAND NATIONAL AIR RACE AND SHOW CORP.
CLIFFORD HENDERSON, *Managing Director*
Executive Headquarters, HOTEL CLEVELAND CLEVELAND, OHIO

Starting on the World's Longest Air Tour Equipped with ~ ~ ~ "*Scarab*" Engines

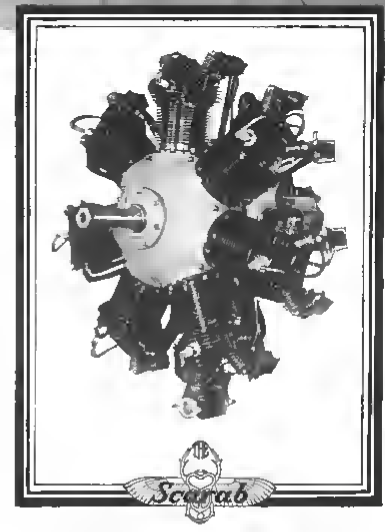
These standard 3 place cabin monoplanes were purchased by the General Tire & Rubber Co for the 50 000 mile tour of the U S Canada Mexico and Cuba

An air tour scheduled to last through a solid year of flying was started from Washington, D.C., on June 21st

This tour will furnish one of the most complete studies of airplane performance ever attempted.

Six Aristocrats, made by the General Airplane Corporation of Buffalo, powered with 110 hp. Warner air-cooled motors, and recently bought by the General Tire and Rubber Company of Akron, comprise the test-fleet

Needless to say we are delighted that Warner Scarab Engines have been selected for such a tour, and that they have been given this opportunity to demonstrate their dependability on scheduled flights under all conditions.



110 H.P. 1850 R.P.M.
WEIGHT 275 LBS.

WARNER "*Scarab*" ENGINES

WARNER AIRCRAFT CORPORATION - - DETROIT, MICHIGAN

MICARTA
REG. U.S. PAT. OFF.

Propellers

are Balanced

THE exceptional performance of Micarta propellers during the many famous flights in which they have taken part is due to several things, chief of which is balance—balance of material and manufacturing processes.

The illustration shows the mechanical balance of the blades against a master blade, which operation, though important, would be futile were not the other factors, such as design, weight, density and similar ones given proportional consideration.

Micarta propellers have exclusive characteristics which result in—

Light Weight	Quietness
Freedom from Vibration	Strength
Accuracy of Profile	Non-deterioration
Efficiency	Adjustable Pitch Setting

A good plane deserves the best propellers. Write for information and prices.

Micarta is also made into:

Pulleys
Fairleads
Hinge bearings
Tailwheels
Cabin-lining plate

Ask for descriptive matter.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
EAST PITTSBURGH PENNSYLVANIA
SALES OFFICES AND SERVICE SHOPS IN ALL PRINCIPAL CITIES

Westinghouse
T 30611

Airport Lighting Equipment:

Chromalite Landing Field Floodlights
Boundary, Approach and Obstruction Lights
Hangar Lights and Reflectors
Transformers and Motor Generators
Mazda Lamps


Wide World Photo

Cablegram
from the "Yellow Bird"

Telegraph

ALL AMERICA CABLES COMMERCIAL CABLES

=NA10 22 CABLE PARIS JUNE 18 1929 130P

==PININSCO PIONEER INSTRUMENT CO NY(754 LEXINGTON AVE BKLYN NY)=

YOUR INSTRUMENTS WERE OF THE GREATEST HELP PARTICULARLY IN BLIND FLYING OUR HEARTIEST THANKS=

LOTTI ASSOLANT LEFEVRE 845A=


Wide World Photo

The "Yellow Bird" carried the following Pioneer Instruments on her transatlantic flight—Earth Inductor Compass, Climb Indicator, Flight Indicator*

*"Controleur de Vol," combining Turn, Bank and Air Speed Indicators, made under Pioneer license in Paris by R. E. Badin.

PIONEER INSTRUMENT COMPANY
754 LEXINGTON AVE. BROOKLYN NEW YORK

Master of the Skies

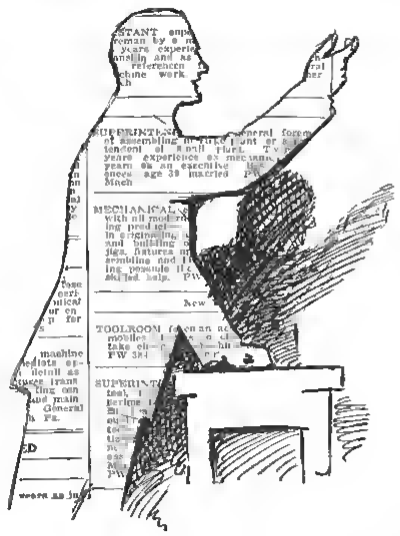
Another new AMERICAN EAGLE

THE PHAETON

The very latest of the remarkable new series of planes which American Eagle is adding to its line. A 3-place biplane powered with Wright Whirlwind 5 (165 h. p.) motor, it offers brilliance of performance, economy of fuel, and structural stability far beyond any plane in its class.

See the American Eagle Exhibit at the Cleveland Aeronautical Show—August 24 to September 2.

AMERICAN EAGLE AIRCRAFT CORP. FAIRFAX AIRPORT KANSAS CITY · KANSAS



"SEARCHLIGHT" Want ads Talk—

They go direct to those in the industry you wish to reach and tell your story in a forceful and business-like way.

They don't mince words but get right to the point.

Use them for—

Agencies Wanted	Industrial Sites
Agents Wanted	Labor Bureaus
Auction Notices	Machine Shops
Bids Wanted	New Industries Wanted
Books and Periodicals	Partners Wanted
Buildings For Sale	Patent Attorneys
Business Opportunities	Patents For Sale
Civil Service Opportunities	Plants For Sale
Contracts to be Let	Positions Vacant
Contracts Wanted	Positions Wanted
Desk Room For Rent	Proposals
Desk Room Wanted	Property For Sale
Educational	Receivers Sales
Employment Agencies	Representatives Wanted
Foreign Business	Salesmen Wanted
For Exchange	Specialties
For Rent	Sub Contracts Wanted
Franchises	Water Front Property
Help Wanted	Work Wanted

Miscellaneous for Sale, for Rent or Want Ads

For Every Business Want "Think* SEARCHLIGHT *First"

0144

ALL WOOD
ALL METAL
COMPOSITE

flotation gear

TANKS *Gas or Oil* · · WOOD *and* METAL PARTS · COWLINGS · COLLECTOR RINGS. ALUMINUM · ALUMINUM ALLOY · · MONEL *and* STAINLESS STEEL PARTS *and* FITTINGS. · · · · · · · ALUMINUM ALLOY HEAT-TREATING. · · · ·

SEYMOUR J. BAUM, *Inc.*

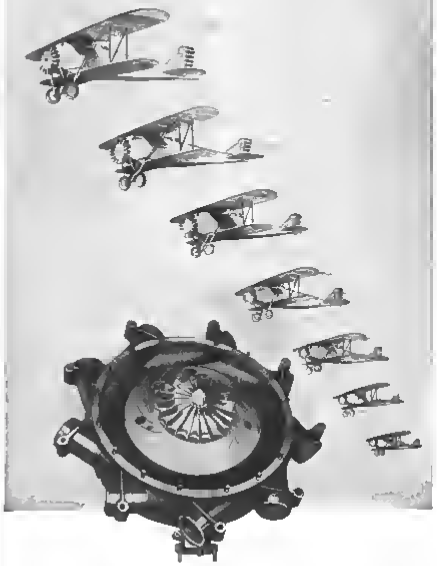
268-288 ALBION ST. ELMHURST, L. I.

Near Queens Boulevard

Telephone Newtown 4420

SUPERCHARGERS

A GENERAL ELECTRIC CONTRIBUTION TO THE SAFETY AND PROGRESS OF FLIGHT



G-E superchargers are small, high-speed centrifugal compressors, built in as a part of an airplane engine, to serve the following purposes:

1. Improvement in distribution.
2. Simplification of carburetors.
3. Moderate or appreciable increase of power at sea-level.
4. Appreciable increase of power at moderate altitudes.

G-E superchargers are standard equipment on practically all leading aviation engines.

324-31

JOIN US IN THE GENERAL ELECTRIC HOUR BROADCAST EVERY SATURDAY AT 8 P. M. E. S. T. ON A NATION WIDE N. B. C. NETWORK

GENERAL ELECTRIC

GENERAL ELECTRIC CO., SCHENECTADY, N. Y.

THANK YOU for mentioning AVIATION

AIRCRAFT SERVICE DIRECTORY

See our Advertisement
on page 181 this issue
PIONEER INSTRUMENT COMPANY
254 LEXINGTON AVE. BROOKLYN NEW YORK

Distributors of
Flightex Fabric
Crystal Clear Dopes
Supreme Propellers
Haskelite Plywood
B. G. and A. C. Spark Plugs, etc.

JOHN S. COX & SON Terre Haute Indiana U.S.A.

We carry a complete assortment of Aeronautical parts and supplies maintain a cylinder service department shipments made the same day order is received. Get our prices on Dopes.

JOHN S. COX AND SON
222-226 So. 7th St. Terre Haute Ind.

Patent Your Ideas
Send me a sketch or simple model of your invention. SATISFACTORY TERMS.
Free Confidential Advice Illustrated Literature
DO IT NOW!
Z. H. POLACHEK 1234 BROADWAY PATENTS NEW YORK REG. PATENT ATTORNEY

OLE FLOTTORP'S RECENTLY
DEVELOPED PROPELLER
Is very efficient and operates with less fluttering or vibration.
For sale by all supply dealers or factory.
FLOTTORP PROPELLER COMPANY
1836 Linden Ave. S.E. Grand Rapids Mich.

Send for Catalog
32 STYLES
AVIATION GOGGLES
Made only by Stevens & Margolin

HASKELITE
PLYWOOD
Used by every important builder. Recognized as the standard plywood for airplane construction. Over 30 applications. Original data book on request.
HASKELITE MFG. CORPORATION
120 S. LaSalle Street, Chicago Illinois

OX-5 SPECIALISTS
Wonderfully complete line of parts for OX motors at attractive prices. Also general utility material and accessories. Cylinder repairing. Send for 1928 Catalogue No. 7
MONUMENTAL AIRCRAFT, INC.
438 Equitable Bldg. Baltimore Md.

DANIEL GUGGENHEIM SCHOOL OF AERONAUTICS
Graduate and Undergraduate Courses in Aeronautical Engineering and Air Transport. Particulars from Dean, College of Engineering.
NEW YORK UNIVERSITY
University Heights New York, N. Y.

AVIATION PROTECTION, INC.
INSURANCE BROKERS TO AVIATION
110 WILLIAM STREET
NEW YORK

The New Tapered Wing Waco is Here
WACO AIRPLANES
Distributors for
Fairfield Co., Conn.

Orange Co		Duchess Co
Putnam Co	Long Island	Rockland Co
Ulster Co	New York City	Westchester
Staten Island		Sullivan Co

N. Y. Aircraft Distributors, Inc.
Roosevelt Field, Garden City N. Y.

PITCH & BANK INDICATOR
Your Position at a glance
Booklet "RIEKER Navigating Instruments" sent on request.
RIEKER INSTRUMENT COMPANY
1919 Fairmount Ave. Philadelphia Pa.

LUDINGTON
Distributors: FAIRCHILD, WACO, KEYSTONE-LOENING AVRO-AVIAN
Authorized Wright Dealers and Service Stations
Aircraft Construction
Complete & modern Repair & Replacement Facilities. High class work. Immediate attention to all Metal, Wood, Covering, Painting and Welding jobs.
Ludington Philadelphia Flying Service, Inc.
Operators of the Philadelphia Airport.
City Office—818 Atlantic Bldg. Philadelphia Pa.

Aeronautical Engineering
Aeroplane Design
Airport and Airline Layout
Stress Analysis—Plant Layout and Research
By Competent Engineers
SUPERIOR AIR SERVICES
612 Gary Place, Chicago, Ill.

PLYCOR Aircraft Plywood Meets All Tests
A HIGHLY SPECIALIZED PRODUCT
Furnished in the following thicknesses:
1/32"—0.8 mm. 3/64"—1.0 mm. 5/64"—2.0 mm.
3/64"—1.5 mm. 1/16"—1.6 mm. 1/8"—3.0 mm.
[illegible] mm.
Panels entirely without seams on either side.
Plycor aircraft plywood is manufactured in mills owned and operated by the largest European plywood producer who for many years has been the chief source of supply for Continental airplane builders.
THE PLYCOR COMPANY
1184 So. Western Ave. Chicago Illinois.

Announcing
Fairchild Laboratory Service for Aerial Photographers
Independent aerial photographers can now secure expert attention in developing of all types aerial negatives also printing, enlarging, rectifying and color. Standard prices. Quick service from nearest Fairchild laboratory.
Fairchild Aerial Surveys, Inc.
270 W. 38th St. New York City
3102 N. Harwood St. Dallas Tex.
224 E. 11th St. Los Angeles Calif.

TRIUMPH
MAGNETIC
FUEL GAGES FOR AIRCRAFT
NEW MODELS FOR COWL, WING OR SPECIAL TANKS
Manufactured by
The Boston Auto Gage Company
PITTSFIELD MASSACHUSETTS

Actual Size
SEND ONE DOLLAR
We will send you by return mail a beautiful pair of sterling silver wings mounted on bar pin with safety catch, also identification card issued by National Flyers Ass'n. These pins are being worn by thousands of aviators, aviation mechanics and boosters.
Illustrated booklet describing Davenport's large Airport and school mailed with each order.
Iowa-Illinois Airways Inc.
Davenport, Iowa

STEARMAN, D. H. MOTH AND MONOCOUPE
GEO. A. WIES, Inc.

Hangar and Office	Garden City
Roosevelt Field 2	New York

GARDNER PROPELLERS
In Stock or on Short Notice
12 Years Experience
GARDNER PROPELLER WORKS
Forest Park, Ill.

Northeaster Flying Togs
Helmets, goggles, flying suits. Write for complete catalog.
RECO DISTRIBUTING CORP.
60 E. 101st St., New York City

RUDDER
How Are You on a Turn?
Do you give it too much or too little rudder? Get an Avigo Bank Indicator and check yourself on turns. Price $6.00.
Write for Booklet on why and what for of a Bank Indicator.
L. H. DIERKING
457 Orange St. Elgin Ill.

AIRCRAFT SERVICE DIRECTORY

PITCH INDICATOR
Adjustable Zero
Readable at a Glance
Booklet on Request
Frasse Aircraft Products
Box 348 New Haven Conn.

RADIATORS THAT COOL PERFECTLY
Airplane radiators to your specification or design for Curtis, OX, Hisso, for either water or oil cooling.
YOUNG RADIATOR CO., Racine, Wis.

Professional Services

THE AIRCRAFT SERVICE DIRECTORY
Brings You Into Weekly Contact With
The Entire Aeronautical Industry

SHOWALTER-ASSOCIATES
Airport Planners Architects Engineers
2210 Park Ave.
DETROIT
Suite 247 Write or Wire

WHERE TO FLY

Alabama

25 Hour primary	$ 500
25 Hour semi-advanced	400
150 Hour advanced	2400
Total 200 hour course	$3300

Includes Training—3 Types Ships and Motors
10 hours cabin ship; 20 hours night flying; 150 hours ground school — Acrobatics; Cross country; Forced landings
New Licensed Equipment Used Exclusively
Administration building and club house
600 Acre Airport—Brick and Steel Hangar
State distributors—American Eagle—Mahoney—Ryan
Montgomery School of Aeronautics
Montgomery Alabama

California

LEARN AVIATION with RYAN
The ONE School that gives COMPLETE quality training. Specializing in long, thorough Ground & Air courses producing expert and commercial pilots.
San Diego has perfect flying weather year 'round. Greatest continuous flying activities of any city in the United States.
It Means Something to be a Ryan Graduate
Send for Descriptive Catalog
T. C. RYAN FLYING SCHOOL
3566 BARNETT AVENUE SAN DIEGO CALIFORNIA

California

Western College of Aeronautics
154 W. Slauson Ave. Los Angeles, Calif.
One of the finest technical and practical air courses in the world
Engineering Designing Flying
The Western Course equips you for positions of executive capacity
Licensed Pilots
Send for catalog

California

LEARN TO FLY
at the Tri-Cities Airport 38 miles west of Chicago. Airport near town. Transport pilots and new production ships. Ground school and flying instruction at reasonable rates. Good accommodations for students. Write for information.
TRI CITIES AIR SERVICE
100 Prairie St., St. Charles Ill.

Illinois

Only 50 miles west of Chicago
Eagle Airport School of Aviation
Herman J. Neubauer, M.D.
Hinckley Illinois
Learn to Fly at our up-to-date school at very reasonable prices. Complete ground and air course. Come any time. Ideal accommodations for students. Expert instructors. Write for information.

Illinois

Learn to Fly at a Midwest Airways Corporation School
Under the direction of John H. Livingston
Three large Airports in the central west—at Aurora Ill., Monmouth Ill. and Waterloo, Iowa. We are training students to fly because we need pilots for the planes we sell. Largest distributors of commercial aircraft in the central states.
MIDWEST AIRWAYS CORPORATION
Waco and Ryan Distributors

Illinois

LEARN Aviation
Complete training in 4 months. Learn to fly on new Big Flying Field. Airplane Mechanics, Construction and Design taught in big 1 story shops. R. R. Fare refunded to Chicago. Spare time work helps pay expenses. Reduced tuition. Send now for Big Free Aviation Book.
COYNE COLLEGE
Dept. 619, 500 S. Paulina St. Chicago, Ill.

Illinois

EGYPTIAN FLYING SCHOOL
Marion Airport Benton, Ill.
one of the
Universal Aviation Schools

Kansas

Porterfield Flying School
Fairfax Field Kansas City, Kansas
one of the
Universal Aviation Schools

Kansas

CENTRAL FLYING SCHOOL
Central Kansas Airport Wichita, Kansas
one of the
Universal Aviation Schools

Massachusetts

LEARN TO FLY IN NEW PLANES
Under the direction of 8 well known pilots. 10 hour course including solo. 50 hour course LIMITED Commercial. 200 hour course TRANSPORT. We also cater to those who have soloed and need only Solo Time with occasional check ups. Further information on application.
Distributors in New England for Ryan Monoplanes, Buhl and Brock Planes.
Massachusetts Airways Corporation
1866 Main St. Suite 808 Springfield, Mass.

Massachusetts

DENNISON AIRPORT
Atlantic, (Boston) Mass.
10 Hour Instruction Course $300
20 Hour Private Pilot Course $605
Includes Transport Ground School
WACO Airplanes Sales and Service

Michigan

LEARN TO FLY IN DETROIT
modern planes used — every student a booster
ANDERSON
write
HARRY ANDERSON
818 Griswold Bldg. Detroit, Mich.

WHERE TO FLY

Minnesota

NR316
UNIVERSAL FLYING SCHOOL
Rochester Airport — Rochester Minn
one of the
Universal Aviation Schools

Minnesota

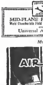
NR 888
UNIVERSAL FLYING SCHOOL
St. Paul Airport — St. Paul Minn
one of the
Universal Aviation Schools

Minnesota

NR 117
MID-PLANE FLYING SCHOOL
Wold Chamberlain Field — Minneapolis
one of the
Universal Aviation Schools

Missouri

PARKS AIR COLLEGE



Complete flying and ground courses under licensed transport pilots New Travel Airs with OX5 Whirlwind and Cirrus motors Send for free copy of "Skyward Ho!" our profusely illustrated catalog

PARKS AIR COLLEGE
204 Mo Theo. Bldg
St. Louis Mo

Missouri

NR1
ROBERTSON FLYING SCHOOL
Lambert St. Louis Airport — Anglum Missouri
one of the
Universal Aviation Schools

New Jersey

AIRVIEW FLYING SERVICE, Inc.
Red Bank, New Jersey
Waco and Fairchild Aerial Taxi Service to Any Point. Flying School Operated from the Finest Field on the Jersey Coast
Hangar Space at Reasonable Rates

New Jersey

NEWARK AIR SCHOOL
LEARN TO FLY! Under the personal supervision of Capt. John O Donaldson Ten new ships Expert instructors with at least 10 years active flying experience. Instruction thorough rates moderate. Most conveniently located airport in metropolitan area 30 minutes from N Y C by car or tube to Newark and number 8 bus
NEWARK AIR SERVICE INC
Newark Metropolitan Airport, Newark, N J.
Write for catalog Tel Mulberry 1218

New Jersey

Murchio Flying Service
Palisade, N J
Flying Instructions $25.00 per hour Pay by the hour Planes to hire to soloed students Instructions given any time

New York

Learn at ROOSEVELT!

THE oldest and most famous field of all. Where Lindbergh, Chamberlain and Byrd started from One of the world's *safest* fields And only 45 minutes from New York Brand new planes by Fleet, designer of army and navy training planes Instruction supervised by Lieut Warren R Carter, on leave from Brooks Field. Student personnel carefully selected *Write* Lieut -Col. N. J. Boots, Roosevelt Aviation School Inc, Mineola, L. I., N Y

New York

AERIAL CHARTER SERVICE
AMPHIBIANS—LAND PLANES
FLYING BOATS
By the Hour — Day — or Week
New York and Suburban Airlines Inc.
Capt HARRY ROGERS, Operations Manager
521 Fifth Ave. New York City
Tel Vanderbilt 8012

New York

LEARN TO FLY
At a CURTISS SCHOOL

The new Curtiss course is now ready It was prepared for you by civil and military experts. It is standard at each of the 35 Curtiss schools. It is conducted solely by Instructors who have taken the special Curtiss Instructors' Course
In this splendid modern course only the finest equipment is used—including the highest priced training planes.
Avail yourself of this first class training and properly prepare for a high place, in the fast growing business of aviation.
CURTISS FLYING SERVICE
21 West 51th Street, New York City

Watch—
the *Searchlight Section*
for
Equipment Opportunities

New York

Learn Aviation in New York
the real center of aviation where more than 51% of the industry has its headquarters
Trained men are needed for the fifty different trades in aviation. A summer course will equip you for an aviation career
Rankin System of Instruction
Free Employment and Welfare Service.
Guarantee of Satisfaction
Institution of Aeronautics
1780 Broadway New York N Y

New York

EMPIRE FLYING SCHOOL
The most up-to-date school and best equipped shop in the East. Complete courses in FLYING and PRACTICAL MECHANICS. Thorough training Qualified instructors Modern ships.
Write for Information
Empire Air Transport, Inc.
Syracuse N. Y.

New York

A Fairchild Activity
The Fairchild School of Flying is a model school for flight instruction not merely another commercial venture It offers courses designed and personally supervised by a specialist with more than 11 years continuous experience in flight instruction Complete equipment including different type airplanes, all of latest design New Dept of Commerce flying school requirements will be fulfilled. Unequalled facilities of the modern Fairchild factories available A wonderful chance for a limited number of students to get the right start in aviation
FAIRCHILD SCHOOL OF FLYING
1000 Conklin St Farmingdale L I N Y

Ohio

LEARN TO FLY WITH
The EMBRY-RIDDLE Co
AIRMAIL-CONTRACTORS
LUNKEN AIRPORT, CINCINNATI, O.
The country wide reputation of the Embry Riddle flying school is based on painstaking methods by government licensed pilot instructors using only licensed planes and the most modern equipment Flying and ground courses qualify students for federal licenses. Special course in gliding and soaring *Illustrated Folder on Request*
DISTRIBUTORS
Waco Mono Aircraft Fairchild Flamingo Gliders, Inc. Wright Aeronautical
AUTHORIZED WRIGHT PARTS DEALERS
REPAIR FACILITIES

WHERE TO FLY

Ohio

NR 818
UNIVERSAL FLYING SCHOOL
Cleveland Airport — Cleveland, Ohio
one of the
Universal Aviation Schools

Ohio

SPRINGFIELD FLYING SCHOOL
Complete ground and flight instruction We train for any grade of license The Little-Greiner Flying Service, Inc., Municipal Airport, Springfield, Ohio Distributors of Travel Air Planes, Central Ohio

Oklahoma

NR461
BRANIFF FLYING SCHOOL
Municipal Airport Oklahoma City Okla
one of the
Universal Aviation Schools

Pennsylvania

LUDINGTON
Distributors FAIRCHILD WACO, KEYSTONE-LOENING.
LEARN TO FLY Complete flying courses complying with latest regulations of the Department of Commerce, adequately equip you for private or commercial license. Expert, licensed instructors Write phone or wire for complete details
Ludington Philadelphia Flying Service, Inc.
Operators of the Phila Airport
City Office—112 Atlantic Bldg Phila Pa.

Pennsylvania

PITCAIRN AVIATION of Pennsylvania, Inc.
10-, 20- and 30-Hour Flying Courses leading to Federal licenses conducted at Pitcairn Field, Willow Grove Pa. one of the largest in the East, in midst of ideal flying country. All-year round school. Modern flying equipment. No liability bond required. Write for Illustrated Booklet.
Land Title Bldg — Philadelphia

Pennsylvania

STULTZ FIELD
TIPTON, PA
Four Way Field
88 Acres
Complete primary and advanced ground and flying courses.
All equipment and personnel licensed by both State and Federal Departments of Commerce. Write for booklet
Altoona Aircraft Corp.
P O Tyrone Pa
Central Pa. distributors for Curtiss Flying Service, Kreider-Reisner Aircraft Corp.

If you don't find the information desired, write to **Searchlight Dept, Tenth Avenue at 36th Street, New York.** All inquiries answered promptly.

Tennessee

NR 818
UNIVERSAL FLYING SCHOOL
Municipal Airport — Memphis, Tenn.
one of the
Universal Aviation Schools

T-A-T *Flying School*
Train under Veteran Air Mail Pilots
Where "Cowboy" Kelly got his training
Solo planes—every type necessary to complete your flying experience—ALL NEW Radio included in ground course for Transport Pilot's License Year round flying schools—perfect flying weather Address T A T Flying School 904 Fort Worth Nat'l Bank Bldg, Fort Worth Texas.
Fort Worth — San Antonio — New Orleans
Dallas — Houston — Amarillo — Atlanta

Wisconsin

Learn to fly at largest and finest Airport and School in the Northwest—New Challenger and Fairchild Air Planes used for instruction
EXTRA SPECIAL
8 hours' cross country instruction on our giant 12 passenger Ford Tri-Motor Plane. Free to first 25 students enrolled Under personal direction of Capt. L. G. Mulzer Board and room can be arranged at Airport at very low rate.
Special attractive prices on all our courses —with easy terms.
Write for full particulars at once
NEPCO-AIRWAYS INC.
Dealers Wisconsin Challenger and Fairchild Airplanes
Capt. L. G Mulzer Gen Mgr
Wisconsin Rapids Wis.

It's Direct—

THE SHORT WAY between the man with Aviation equipment to sell, and the buyer, is Aviation.

When you have idle equipment to dispose of, advertise it in the Searchlight Section of Aviation. No trouble; no delay.

Address
SEARCHLIGHT DEPT.
10th Ave. at 36th St. New York City

SEARCHLIGHT SECTION

EMPLOYMENT and BUSINESS OPPORTUNITIES—USED and SURPLUS NEW EQUIPMENT

UNDISPLAYED—RATE PER WORD
Positions Wanted, Positions Vacant and all other classifications, excepting equipment, 10 cents a word, minimum $2.50 an insertion. 15 cents a word if a box number address care of any of our offices is used.
Proposals 40 cents a line an insertion.

INFORMATION
Box Number may be in care of our New York Chicago or San Francisco offices.
Discount of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH
1 to 3 inches .... $6.00 an inch
4 to 7 inches .... 5.75 an inch
8 to 14 inches .... 5.50 an inch
Other spaces and contract rates on request.
An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

FOR SALE

AIR KING OX-5 bargain. New last August. Completely reconditioned. All new landing gear. Eligible for license. Never crashed. Fly away $1,600. Monarch Aircraft Industries, Rockford, Illinois.

AMERICAN EAGLE almost new with Anzani 120 hp motor. Ship and motor had 120 hours, motor 10 hours since complete factory overhaul. Two Scintilla mags, compass, heater and many other extras. Will sacrifice for $2,700 on quick cash deal. John Berforture, 452 Willoughby Ave., Brooklyn, N. Y. Telephone Williamsburg 6600.

DEMONSTRATORS and trade-ins for sale. 1 J-5 Whirlwind, 6 place Travel Air Monoplane; 4 OX-5 Travel Air biplanes; 1 J-5 Whirlwind Waco 10; 1 C-6 Curtiss Oriole; 1 Biplane Waco 7 type; 3 Jennies; 1 TM Scout; 1 Lincoln Page damaged. Come and see. You will buy. No reasonable offer refused, and no letters answered. Hoosier Airport Inc., Indianapolis, Indiana.

FOR SALE. Ryan Brougham B-1, good condition, never crashed. Whirlwind motor recently overhauled. Lots of equipment. Reasonable for quick delivery. FS-127, Aviation, 520 No. Michigan Ave., Chicago, Ill.

FOR SALE. Hisso Standard J-1 with dual controls, ready to fly away. Motor in good condition. Model A Hisso motor, 150 H.P. For quick sale $750.00. Public Service Station, Dunn, N. C.

FOR SALE. One 80 hp LeRhone and one 35 hp Anzani engine. Also have number of 60 hp Velie M-5 engines purchased on large contract. Having now adopted 90 hp engines as standard on our Golden Eagle airplanes we are willing to sell these smaller engines which are all new, at reduced prices. Golden Eagle Aircraft Corporation, 415 East Industrial Avenue, Inglewood, Calif.

FOR SALE. LS-5 Wright E Hisso 180 hp motor, $600, a real buy at $2,250; can be licensed or will trade for Travel Air. Also J-1 Hisso Standard 150 A, $1,200, both ships now flying and in excellent condition. Lee Time Airport, Tiffin, Ohio.

FOR SALE. 5 place Buhl Airsedan, J-5 Whirlwind motor about 500 hours time. Fine condition and a splendid cross country ship for regular line or taxi service. Has always been well kept up and motor checked frequently. Priced right and a bargain for someone. FS-161, Aviation, 520 No. Michigan Ave., Chicago, Ill.

RYAN BROUGHAM

Wright J-5 engine. Total time 150 hrs. This ship has been privately owned and flown. It is in perfect condition and represents a real bargain. Equipment includes Bank and Turn, Air Speed, Pitch and Climb Indicators, compass, clock and Hamilton Prop. This ship is offered for an unusually low price. Free delivery within 500 miles. For further particulars and photographs apply to

Wright & Esenwein, Inc.
Buffalo Airport, Buffalo, N. Y.

FOR SALE

FOR SALE. Jennie with high lift wings, all new covering, less motor. Leach Bros., Towner, N. D.

FOR SALE. Curtiss JN-4 with Allison high lift wings, ready to fly, $600. Chas. A. Ewing, Bloomington, Ill.

FOR SALE. Travelair demonstrator, 21 hours, $2,600. Waco ten, same as new, $1,825. Eagle Rock, excellent condition, $1,075. Will give ten hours instruction free to purchaser of either plane. 1368 First National Bank Bldg., Detroit, Mich. Cadillac 8802.

FOR SALE. Waco 10 OX-5 fully equipped ship and motor in excellent shape. $1,900. Devers Brothers, 43 Clifton Place, Jersey City, N. J.

FOR SALE. 1928 Waco 10 in excellent condition. Engine over 1,400 in blocks. Price $2,000. Complete set of Driggs Dart wings and struts cheap. Tred Avon Flying Service, Inc., Easton, Md.

FOR SALE. OX-5 Standard J-1, dual controls, just reconditioned, in good shape. $600. Roy R. Smith, 174 Stevens Ave., Highland Park, Michigan.

FOR SALE. Jenny 34D, A1 condition, $900. Will give instruction. George Kelm, 178 Cleveland Ave., Mineola, N. Y.

FOR SALE. 1928 Waco 10 like new, equipped with new J-5 Wright Whirlwind motor. In structed front and rear cockpits. Price $4,200. Flyaway. Ronald McComb, 100 South La Jolla St., Los Angeles, Calif.

FOR SALE. Sport light plane complete, flyaway. Also fuselage, rudder, propellers, light plane parts. Can be seen anytime. FS-157, Aviation, Tenth Ave. at 36th Street, New York.

—Twenty— Liberty Motors

Unassembled . $200.00 each

For schools, just to be found slightly damaged, enough used parts to build a complete Liberty twelve cylinder motor with exhaust manifolds, propeller hub and hand starter, $200 each.

For airplanes and motor boats enough used parts in good condition to build a complete Liberty twelve cylinder motor with exhaust manifolds, propeller hub and hand starter, $250.

Enough good used parts to build Model "A" Hisso, $100.

Enough used parts to build Model "E" Hispano for flying, $150.

Model "E" Hisso assembled in dry shape, $200.

Salmson Nine Cylinder Radial less one magneto, $115.

Liberty Slab Tooth gears per set, $40.

Hand Starters "Liberty," $5.

Liberty Carburetors, $15.

We carry a complete line of Curtiss D12, Liberty, Mercedes parts as well as Observation Balloon Grills, Search Lights, Power Plants for Search Lights, most any type magneto desired, and a large stock of new Model "E" Hispano motor parts as well as tires, wheels, instruments, gas and oil tanks and radiators for most any type ship or motor.

Rosenfield Aircraft Co.
College Park, Maryland
Mail Address P. O. Box 58 Mt. Rainier, Md.

FOR SALE

HANGARS, steel T, single and double hangars. New and used. Portable and permanent. Shipped knockdown. Big discount and terms. H. T. Norberg, Universal Exhibits, Monadnock Building, San Francisco, Calif.

HISSO motor, model A, almost new, overhead radiator, tachometer, oil reservoir, complete, ready to set in ship. First $400 takes all. Everything guaranteed, no junk. Geo. Belanger, 384 Fielding St., Ferndale, Mich.

HISSO Standard motor and ship for sale. A1 condition, aluminum center section tank, DH wheels, wind driven and wobble pump, pressure type fire extinguisher. Flying every day. Price $1,600. Olof Hellengren, 16 Hillcrest Ave., Port Chester, N. Y.

NEW OXX-6 motors in original boxes, very reasonable price. Will ship with privilege of inspection. Great Marine Motor Company, 2126 St. Clair Ave., Detroit, Mich.

NEW and used American Eagle, Waco and Travel Air wings. We make to order any type of fuselages, landing gears and wings. Reasonable prices. Revelation Aircraft Company, 225 West 57th St., New York City. Circle 1010.

ON account of change to greater horsepower motor we are in a position to dispose of several new and used Velie motors; these were bought at quantity discount price and can be sold very reasonably. Mohawk Aircraft Corporation, 2600 Delaware St. S. E., Minneapolis, Minn.

ONE BSCL flying boat, new ribs and keel in bottom. Wings rebuilt but not recovered. Motor has been overhauled. Ship complete with motor, rad. and prop. $500. George Schaaf, Greenridge, Staten Island, N. Y.

OX-JENNY fuselage and empennage rebuilt and recovered, center section and main tanks. No splices in spars. C license the past year. Priced reasonable. Sidney P. Fowler, Route 1, Keosauqua, Ia.

OX-5 WACO nine, licensed, duals, motor in fine shape, ship kept in hangar. C. O. Trim, Fergus Falls, Minnesota.

CHARLES MONOPLANE WITH OX5 MOTOR, 3 MONTHS OLD.
Top Speed 100 miles per hr. Three place open cockpit type. Will accept late model Automobile as part payment. Price for quick sale $2,000. Will Demonstrate.
R. L. CHARLES
Wheeler Air Port, Zanesville, O.

FLEET BIPLANE
Warner powered. Blind flying instruments. Trunk, tools and engine and cockpit cover. Engine has had less than 65 hours and whole job is practically new. — For sale at very reasonable price. Owner is getting same type of machine with larger engine. Please communicate with Box No. FS-94, Aviation, Tenth Ave. at 36th St., New York City.

Hisso-A—$450. Complete like new Curtiss C-6-A—$550. Hisso hand starter—$45. Wood pontoon for light plane $35. M F uncovered rudders and horiz. stabilizers $25 each. Used OXX cylinders $5 each. OX5 hand starters $10. C-6-A parts. New Haven.
AIR TERMINAL INC.
P. O. Box 519 New Haven, Conn.

FOR SALE

PITCAIRN-OROWING ready for demonstration, priced at $1,600 for quick sale. Miller Corporation, New Brunswick Airport, New Brunswick, N. J. Telephone 4362.

RYAN B-1 Cabin job for sale, 4 passengers and pilot, with J-5C motor, 20 hours since complete overhaul, brakes and standard steel propeller, $5,400 for quick sale, $3,600 without motor, fully equipped, ready to fly away. M. A. Caffarello, 460 North Halsted St., Chicago, Ill.

RYAN Brougham B-1 Wright J5CA absolutely in first-class condition, always kept in hangar, 145 hours, $7,000 cash. Need money. FS-145, Aviation, 520 No. Michigan Ave., Chicago, Ill.

SAILPLANE in fine condition, finished and flown May 1929. Built at aviation school. Span 44 feet, weight 124 pounds. Going away and will sell for $200. Pictures and data on request. Richard Meyenburg, 1223 Prospect St., La Jolla, San Diego, Calif.

STINSON Detroiter Biplane, J-4 Wright 200 hp, Earth inductor compass and instruments complete. Never crashed and always stored in hangar. $3,600 for quick sale. Box 383, Dearborn, Mich.

TWO Federal licensed Seagulls, metal props and scintilla mags. Complete, overhauled and rebuilt. Balanced ailerons. Act quickly, best reasonable offer accepted. FS-160, Aviation, Tenth Ave. at 36th Street, New York.

TWO OX-5 motors for sale in excellent condition; one has 75 hours, one 130 hours, have not been flown since overhaul. $400 and $300 respectively. Two for $700. Albert C. Coel, Reading Airways, Reading, Pa.

TRAVEL AIR, 3 months old, dual controls, special orange factory paint job, never cracked. Licensed. Consolidated air speed, Compass, 102 hours. Motor just rebuilt 10 hours ago at a cost of $420 with the following new parts: 8 cylinders, 1 new production Berling magneto, Thompson Silchrome valves, perfect circle rings, complete Miller overhead, turns 1,400 on ground. Been used for pleasure only. Priced $2,250. Reason for selling just bought new Whirlwind job. E. P. Dutro, Zanesville, Ohio.

Hisso A $450. Complete, like new Curtiss C-6-A $500. Hisso Hand Starter $45. Wood Pontoon for light plane $35. M F uncovered Rudders and Horiz. Stabilizers $20 each. Used OXX cylinders $5 each. OX5 hand starters $15. C-6-A parts.
New Haven Air Terminal Inc.
P. O. Box 519, New Haven, Conn.

Over 20,000 other men in the growing aviation industry

see this page!

ADVERTISE HERE FOR QUICK AND PROFITABLE RESULTS

ADDRESS

SEARCHLIGHT DEPT.
TENTH AVE AT 36th ST.
NEW YORK, N. Y.

Av 5

EQUIPMENT WANTED

WANTED—Complete set of wings for 1927 Air King. Leach Bros., Towner, N. D.

WANTED to buy OX-5 Standard; state price and condition in first letter. Harvey O. Stires, Phillipsburg, N. J.

WANTED Curtiss Seagull M F Boat, or 3 place pontoon job. A. Ziegler % Link Motors, Newtown and Second Avenue, Long Island City, N. Y.

POSITIONS VACANT

DRAFTSMEN, layout men and detailers with several years aircraft experience. Excellent opportunity for men with experience and ability. Keystone Aircraft Corporation, Bristol, Pa.

WANTED transport pilot who can fly M F Flying Boat. Steady position. Good salary flying airmail. New Orleans Airline, New Orleans, La.

WILL employ a limited number of young men with grade school education. While learning to fly, good pay. Apply at once. 1369 First National Bank Building, Detroit, Michigan.

POSITIONS WANTED

FACTORY superintendent, experienced and capable of taking entire charge of aircraft production. Desirable of making change. Available August 1st. Eastern coast preferred. PW-143, Aviation, 520 No. Michigan Ave., Chicago, Ill.

LIMITED commercial pilot desires position. Parks graduate. Alfred Brush, Elk Lake, Wis.

PARACHUTES for aerobatics and X flying ordered by Department of Commerce. Any large licensed school or corporation can use my experience to advantage. Army trained and factory finished. Five years United States service and two years factory. Specialist on Irvin and Russell. Licensed parachute instructor with theoretical knowledge broadened by over one hundred jumps. Locality no object. PW-164, Aviation, 883 Mission St., San Francisco, Calif.

Available as a Unit to Manufacturers or Operators

A crew of four, comprised of two transport pilots, possessing a combined total time of over 5,000 hours, including instruction, testing and sales, a production manager capable of taking entire charge of manufacturing and maintenance of all types of ships, a licensed mechanic and pilot expert on all present-day power units.

This crew is capable of completely managing your production from blueprints to fly away, including assembly, motor repair, testing, instruction, sales and passenger carrying, and presents an opportunity to a financially sound organization to avail themselves of an efficient, well-informed and smooth-working organization, each member of which possesses a clean record and has a wealth of experience to draw upon.

PW-159, Aviation
520 No. Michigan Ave., Chicago, Ill.

WANTED
AIRPLANE SALESMEN
by one of the oldest Airplane Companies in United States. Applicant must be seasoned, well trained to sell dealers and assist them in building business. Must be pilot. Apply
AVIATION ADVERTISING CO.
604 Schweiter Bldg., Wichita, Kans.

POSITIONS WANTED

PILOT, transport permit, 26, married, good references, 330 hours of barnstorming and student instruction, desires immediately connection with operating company or individual preferred. Available now, go anywhere. PW-162, Aviation, 520 No. Michigan Ave., Chicago, Ill.

PILOT, 29, married, 70 hours, sober, steady and reliable, desires immediate connection as pilot, field manager or sales demonstration with operating company or individual. Can furnish plenty of references. PW-153, Aviation, 520 No. Michigan Ave., Chicago, Ill.

YOUNG man, married, desires a steady position as operations manager and pilot. Am licensed mechanic, 1,000 hour pilot. Can fly any open job. Prefer to instruct. Desire permanent connection with any good all year around firm. Have been an airplane mechanic for sixteen years. Can handle men and am a go-getter. Have operated shop, flying and passenger services. Am at present engaged as service manager for large New York Aircraft firm. Have a good instruction ship of my own. I absolutely do not use liquor. What is your offer? PW-158, Aviation, Tenth Ave. at 36th Street, New York.

BUSINESS OPPORTUNITIES

For Sale
Passenger flying location and OX-5 Waco 10. Field located at Freehold, N. J., on main Atlantic City highway. Established three years. Chadwick Brothers, Freehold, N. J.

MISCELLANEOUS

ATTENTION Aviators! Valve guides installed on OX cylinders $1.00 per guide; removable valve seats installed $1.00; descriptive literature upon request; all work guaranteed. Illinois Flying Co. New location, 4 West 4th St., Sterling, Ill.

MACHINE shop service on OX-5's. Cylinders reground, new pistons, pins and rings. Graphite guides and inserted seats installed. Oversize pins installed in valve actions. Main and connecting rod bearings line reamed. All work guaranteed. New OX-5 parts. Write for complete circular. Heckman Machine Works, 4026 West Lake St., Chicago, Ill.

Learn Welding

LEARN WELDING and lead burning in the best equipped school in St. Louis; day and evening instruction; no classes, each student has unlimited personal instruction, no time limit. Full course on all the common metals including aeronautical tubing, only $100. Get your money's worth. Aeronautical Engineering Company, 2903 Shenandoah Ave., St. Louis, Mo.

AVIATION—Salary while learning $18 to $35 per week while under instruction in our factory and shops. Call or write for information without obligation. AERO CORPORATION OF AMERICA, Department AV, 63 Second Street, Milwaukee, Wisconsin.

PATENTS—TRADE MARKS
Don't Lose Your Rights To Patent Protection
Before disclosing your invention to anyone send for free blank form "EVIDENCE OF CONCEPTION" to be signed and witnessed.
LANCASTER & ALLWINE
Registered Attys.
431 Ouray Bldg., Washington, D. C.
Originators of forms "Evidence of Conception"

USED PLANES FOR SALE

These planes represent surplus equipment resulting from the consolidation of the various organizations making up the undersigned corporation. All are in excellent condition and ready to fly away. Any airplane listed here will be delivered within a radius of 500 miles from its location. Planes subject to prior sale.

Name of Airplane	Type	Open or Cabin	No of Persons	Ship No	Motor No—of Hours	Ship Time	Price as is F.O.B. Location
Monocoupe	Mono	Cabin	2	C6923	40 hr Velie	35 hr	$1,500 St Louis
Monocoupe	Mono	Cabin	2	C6538	60 hr Velie	55 hr	$1 500 Minneapolis
Curtiss-Robin	Mono	Cabin	3	C7497	31 hr OX 5	37 hr	$3,400 Minneapolis
Curtiss-Robin	Mono	Cabin	3	C7507	21 hr OX-5	70 hr	$3,500 Minneapolis
Waco 10	Bi	Open	3	C6939	New OX-5	New	$2,500 St Louis
Standard J 1	Bi	Open	2	[illegible]	Overhauled OX 5	New	$1,500 St Louis
Ryan	Mono	Cabin	5	C958	30 hr W W J5	400 hr	$4,800 St Louis
International	Bi	Cabin	6	C3266	90 hr. W W J5	90 hr	$4,500 St Louis
Lockheed Vega	Mono	Cabin	6	NC7953	125 hr. Wasp	120 hr	$17,500 St Louis
Ryan	Mono	Cabin	5	C3423	50 hr W W J5	250 hr	$6,500 St Louis
Cessna	Mono	Cabin	4	NC6442	126 hr W W J5	111 hr	$7 000 St Louis
Fairchild	Mono	Cabin	5	C444t	80 hr W W J5	75 hr	$7,000 St Louis
Curtiss-Robin	Mono	Cabin	3	C124E	20 hr OX 5	18 hr	$3 400 St Louis
Ryan	Mono	Cabin	5	C4654	125 hr W W J5	275 hr	$5 000 Oklahoma City
Ryan	Mono	Cabin	5	C1787	Rebit W W J5	500 hr	$5,500 Oklahoma City
Lockheed Vega	Mono	Cabin	5	C7426	Rebit W W J5	250 hr	$8,000 Minneapolis

Department W-7

UNIVERSAL AVIATION CORPORATION
Robertson Division

USED PLANE DEPT.

N339

Lambert-St. Louis Airport, Anglum, Missouri

JUST THE SHIP
FOR
Heavy Duty Work

STINSON SB 1 BIPLANE
Only 150 Hours Use by Private Owner
Flown for Recreation
$5250.00 Complete
with Instruments Steel Propeller and J-5 C A Wright Motor

Wright and Esenwein, Inc.
Buffalo Airport
Buffalo, N. Y.

MOTORS

A number of new OX5 Motors priced for immediate sale $750 Also a number of OXX6 motors at $800 f o b Wichita or Detroit Address

AVIATION ADVERTISING CO
604 Schweiter Bldg Wichita, Kans

MOTOR

Absolutely sound licensed Challenger 11 months 150 hours new Berryloid newly rebuilt motor Thompson valves Miller rockers Monnid propeller parachute seat $2 500

G M CROSS
184 Ward Street Newton Center Mass

FAIRCHILD F-C 2

Privately Owned and Flown

Licensed mechanic with plane at all times J-5 Engine —270 hours. Just had top overhaul. Bank and turn indicator Price makes this a real bargain

FS 155, Aviation 520 No Michigan Ave., Chicago, Ill

CLOSING OUT

2—Berling D-81 Magnetos new production model unused

1—Berling D-81 Magneto used only 8 hours perfect

3—Berling D-81 Breaker Assemblies 2 new 1 used slightly

38—Model Spark Plugs new heavy type motor unused

1—Lot of OX5 Parts almost all new some used only 5 hours perfect, market price of the lot $188 84

1—Hoof Guide and Valve Replacement Outfit complete jigs, reamers, drills etc with ½ in Van Dorn & 700 heavy duty 110 electric drill outfit for OX5 and OXX6 never used cost $215

1—Lot of 22 new and slightly used Aircraft instruments all perfect except one glass cracked Altimeters switches, gauges air speed gas pump manifolds tachometers etc all told $250 worth at market prices

Will sell the whole works as listed for $250 can be inspected Will not sell separately

Rhode Island Air Service, Box 115, Hillsgrove, R. I.

"Opportunity" Advertising:

Think *"SEARCHLIGHT"* First!

G-20

—a *second-hand* Motor

—a *two-year-old* Plane

YET IT BROKE A WORLD'S ENDURANCE RECORD

(Following material quoted and reproduced from New York World of May 27 1929)

Plane Aloft 7 Days, 4 Hrs., 32 Minutes, Ends Record Flight

FORT WORTH Tex., May 26 — After setting a new world record of 172 hours 33 minutes and 1 second for sustained flight the monoplane Fort Worth glided safely down to earth here at 4 05 o'clock this afternoon (6 05 P M New York time)

The motor of their plane a Wright Whirlwind which had carried the rebuilt monoplane through more than 500 hours of flying before the endurance flight was started was still in excellent condition

FORT WORTH Tex May 26 — The world at large appears to be amazed at our little flying feat accomplished in a two year old plane powered with a second hand motor but our principal astonishment is that we were forced to renge down after only 172 hours and 33 minutes in the air

Although we are back on earth after spending more than a week in the cramped environs of our rebuilt Ryan as it slowly but surely flew past every world's record for endurance flying We are proud of its performance and of our part in setting up a record which we hope will aid in promoting public confidence in air travel and the safety and durability of airplanes

---

GOOD SECOND-HAND EQUIPMENT

has an important part in all present-day industrial activity. When cost or delivery, or both, are urgent factors, don't let old prejudices prevent your giving it the consideration it deserves. Many dealers in second-hand equipment sell with guarantees that fully protect buyers. Some completely rebuild all equipment offered and their stocks include many types of the most modern items available.

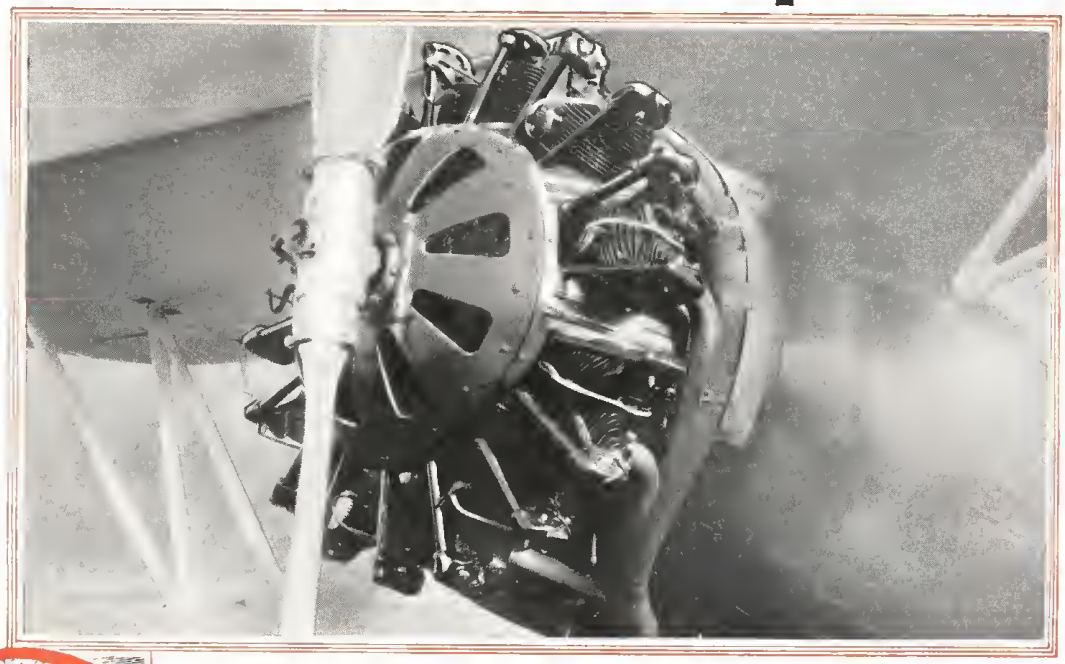
If a *used* plane with a *second-hand* motor can help two aviators break an *endurance* record why not investigate what second-hand equipment can do *for you* in solving equipment problems within your budget limitations?

ALPHABETICAL INDEX TO ADVERTISEMENTS

SEARCHLIGHT

AIRCRAFT SERVICE DIRECTORY

Sixteen thousand hours of "HORNET" power



THE international fame of the Pratt & Whitney "Hornet" engine rests upon millions of miles of dependable flying power.

To illustrate: One transport operator . . . flying thousands of miles on schedule, day and night, with passengers, mails, and express . . . makes this report of 44 "Hornets".

In 16,757 hours of total operation to date, the 44 "Hornets" have flown a total of 1,709,200 miles. The average number of flying hours per engine has been 380¾. The average number of miles per engine is 38,836. The average hours for the six engines longest in service is 876. The average number of miles flown by these six engines to date is 89,352.

This record should be significant to those seeking the speed, comfort, safety that come from "power in reserve".

THE
PRATT & WHITNEY AIRCRAFT CO.
HARTFORD - - - CONNECTICUT
Division of United Aircraft & Transport Corporation

Manufactured in Canada by The Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, Quebec; in Continental Europe by The Bavarian Motor Works, Munich.

Wasp & Hornet ENGINES